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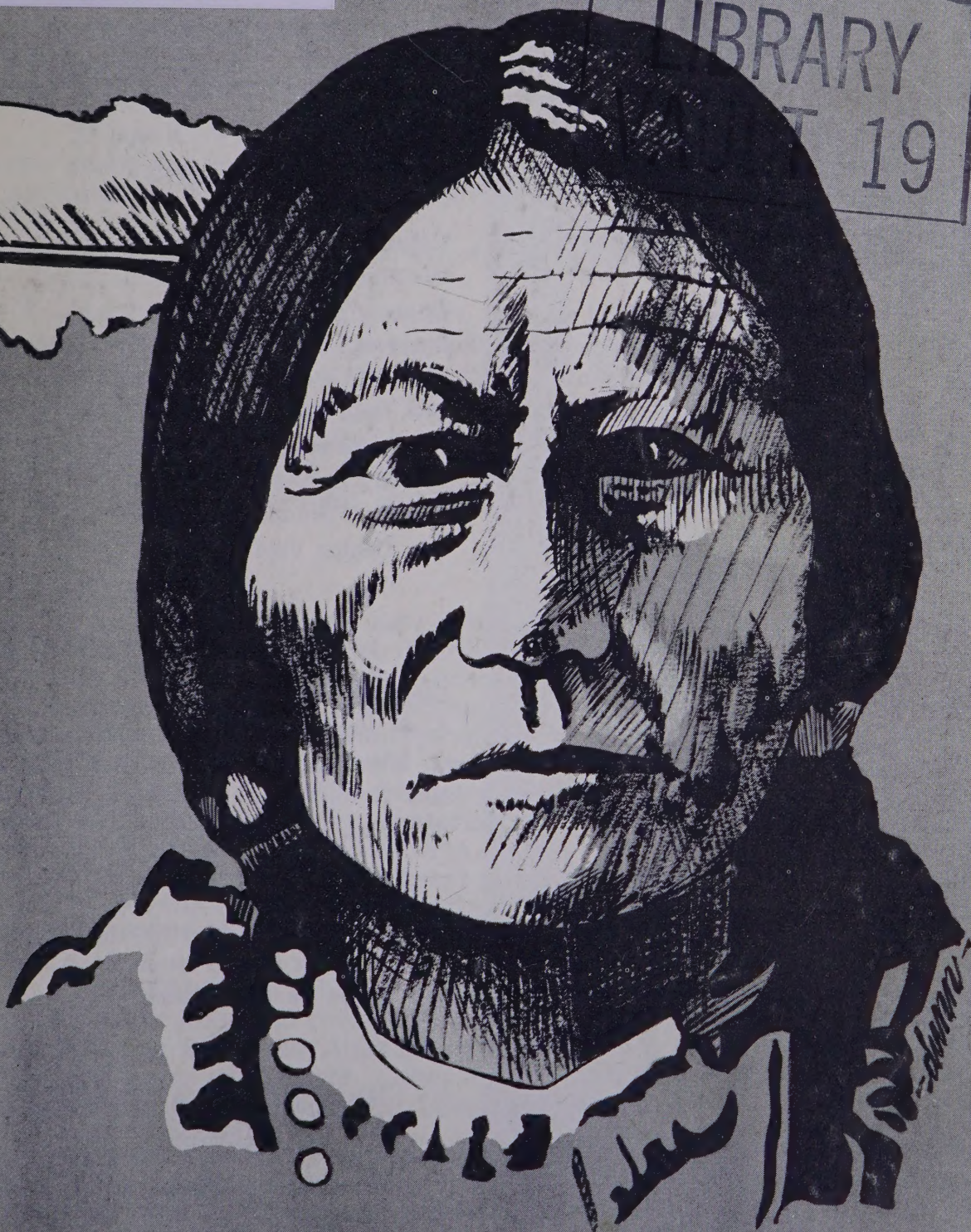
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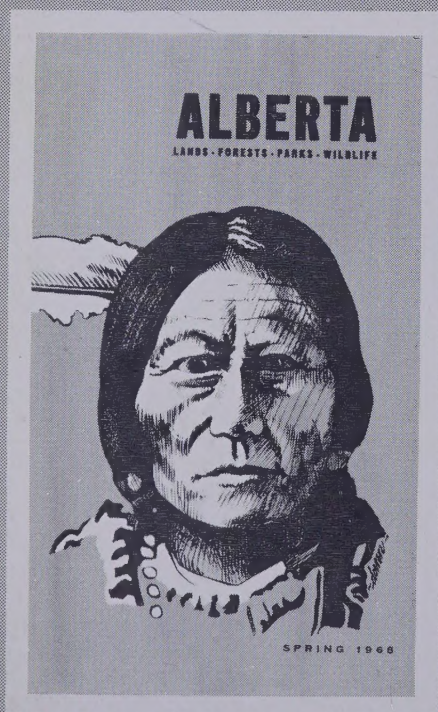


SPRING 1968

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DEDICATED TO THE WISE USE
AND MANAGEMENT OF THE
PROVINCE'S RENEWABLE
NATURAL RESOURCES; ITS
LAND, FORESTS, PARKS AND
WILDLIFE.

ABOUT OUR COVER



One of Chief Sitting Bull's warriors.
See "Writing On Stone", page 4.

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ALBERTA

Lands - Forests - Parks - Wildlife

Vol. 11, No. 1

Spring 1968

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line would be appreciated.

Hon. HENRY A. RUSTE,
Minister

V. A. WOOD,
Deputy Minister

With each and every issue of ALBERTA — Lands, Forests, Parks and Wildlife our readers express their interests and wishes.

Since I took over the editor's chair a little more than a year ago my staff has attempted to give the magazine's subscribers a deeper and more searching look into the varied world of the Department of Lands and Forests work.

The present Spring issue is no exception. The mystic Writing-on-Stone Provincial Park, The Fire Bomber and Trophy Fishing in Alberta are three articles searching into this wonderful government department's exciting life.

We promise to keep providing our 15,000 readers with continued enjoyable reading and hope to, in future issues, provide better photographic coverage and more informative illustrations.

If you have any "hot" ideas on what the magazine should write about and publish, please do not hesitate to contact us as I will be happy to give consideration to any good ideas and topics.

* * *

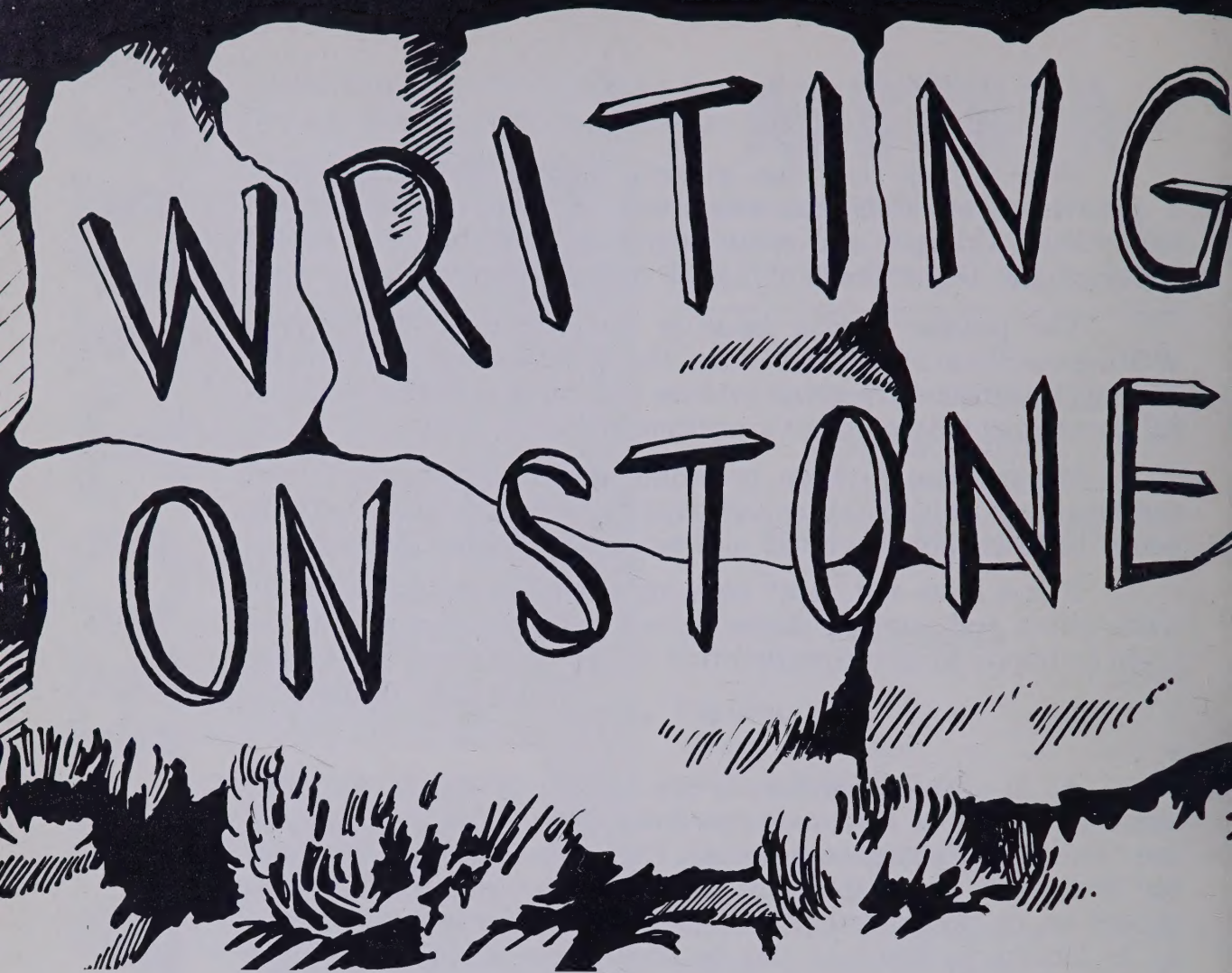
As in any publication we are human to err. In the 1967 summer edition of this magazine information was published on the "Fabulous Fishing in Alberta". Under the angling techniques for Walleye it was stated that the bait to be used on these fish should be, or closely resemble a live fish. Of course this is wrong as in Alberta no live bait may be used in the catching or luring of fish. However, your bait should still attempt to resemble a live fish.

* * *

At the present time a new colorful folder featuring "Fishing in Alberta" is available for distribution. The new folder is the only one of its type in North America. On one side is a map of Alberta with the province's various rivers, streams and lakes in different colors. The colors indicate the type of fish to be found in the specific water in question. While the northern portion of the province is not completely covered, as new information becomes available a further printing of the folder will include up-to-date material. The other side of the folder highlights the 16 sporting fish of Alberta. In full color and information packed, this folder is expected to be in great demand. You are advised to get your order in for these new folders early. The cost ??? Free. However, any large requests will be held until the single orders are completed.

The "Fishing in Alberta" folder is the first in a series of publications that will be in color and cover wide-ranging subjects. The next printing will deal with the Big-game Animals of this province and the following one is on the Trees of Alberta. Other topics to be covered include: Upland Birds; Waterfowl; Reptiles and Historical Sites.

A second publication now available is the "Provincial Parks Guide Book". This booklet covers each of the province's 44 provincial parks with thumbnail sketch descriptions, location map and an easy to read facilities chart. The booklet is also free. No multiple orders will be accepted.



A strong bronzed hand held the shiny blade as it scraped the rock's surface. The silvery shaft of steel once hung on the side of a U.S. cavalry officer who gave his life at the "Little Big Horn".

The Sioux warrior was now guarding members of his tribe hidden in the rocks and caves below. As he watched for signs of any approaching "Red Coats" or "Long Knives" he carved various pictures into the soft brown stone. Chief Sitting Bull took his tribe and headed north across the Canadian Border after his victory over General Custer and was now camped in the shadow of cliffs overlooking the Milk River, just north of the border.

During the battle of the Little Big Horn, Sitting Bull sent his dead and

wounded warriors to this hide-out on the night of June 25th, 1876, wrapped in the tunics of dead American soldiers.

Ninety years later, people can climb into the same hills and view the Indian's carving done while he stood sentinel duty.

Today the area of the carvings are enclosed within Writing-on-Stone Provincial Park's 1,055-acre boundary in the valley of the Milk River west of the border crossing at Coutts. The park was established in 1961.

Many carvings, known now as petroglyphs, were gouged into the stone before and after the arrival of Sitting Bull's tribe. In fact, some petroglyphs have been catalogued by Selwyn Dewdney, an art teacher and a spare time



searcher for Indian pictographs, as being carved before 1650.

The majority of the writings can be found on the north bank of the Milk River about two miles west of the park's campsite (see map). These sites are easily accessible by road from the top of the cliffs directly above the campsite. The writings are generally divided into three separate sites (designated #97, 98 and 99 by a Glenbow Foundation publication and key). Of the sites, the most extensive writings can be found at site 98 which is the most westerly of the sites.

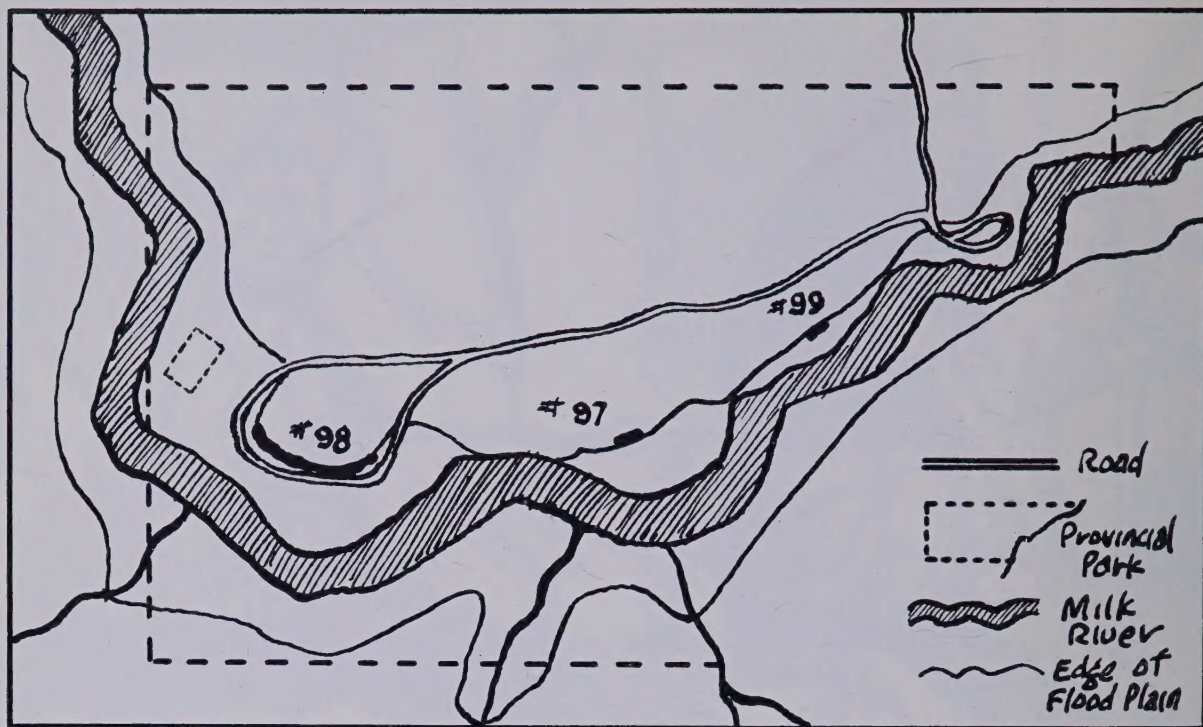
Number 97 is located about a quarter mile to the east, but is virtually inaccessible due to the position of the river at the base of the cliff. However, the location of 99, commonly referred

to as the "Battle Scene" is reachable by road.

There are other sites located throughout the park, but most are hard to get at. There is one other good area which is to be found in Police Coulee on the western cliffs about 200 yards south of the coulee's mouth and south of the river.

Most of the writings are located on the north bank and in relatively sheltered areas, there have been many interesting theories as to the origin of the writings.

Alva Blair of Milk River feels that the writings are merely "doodlings" done by the Indians winter camped in the area. As the north bank is sheltered from the wind and warm on sunny



Sites of Writings

days, the Indians would gather along these cliffs for warmth.

The exact tribe of Indians that did the writings is not known. Many tribes have lived in the area or travelled through the region from the United States and Saskatchewan. The most recent Indians of the area are the Blackfoot. They ranged from as far south as Yellowstone north to the Milk River area. Prior to the beginning of the 19th century, the mountain tribes of the Kootanae, Pend d'Orielles and Flatheads inhabited the area. Other tribes of the area are Crees, Sioux, Crows and Assiniboines. Therefore, any of the above mentioned tribes could have made the writings. Upon the receiving of guns in the early 19th century, the Blackfoot tribe took over the area.

James Doty, a representative of the American Government on a treaty making mission to the Blackfoot in 1855, was the first white man to see the rock writings.

Doty wrote: "They (the sandstone rocks) are worn by the action of weather into a thousand fantastic

shapes, presenting in places smooth perpendicular surfaces covered with crude hieroglyphics and representations of men, horses, guns, bows, shields, etc., in the usual Indian style."

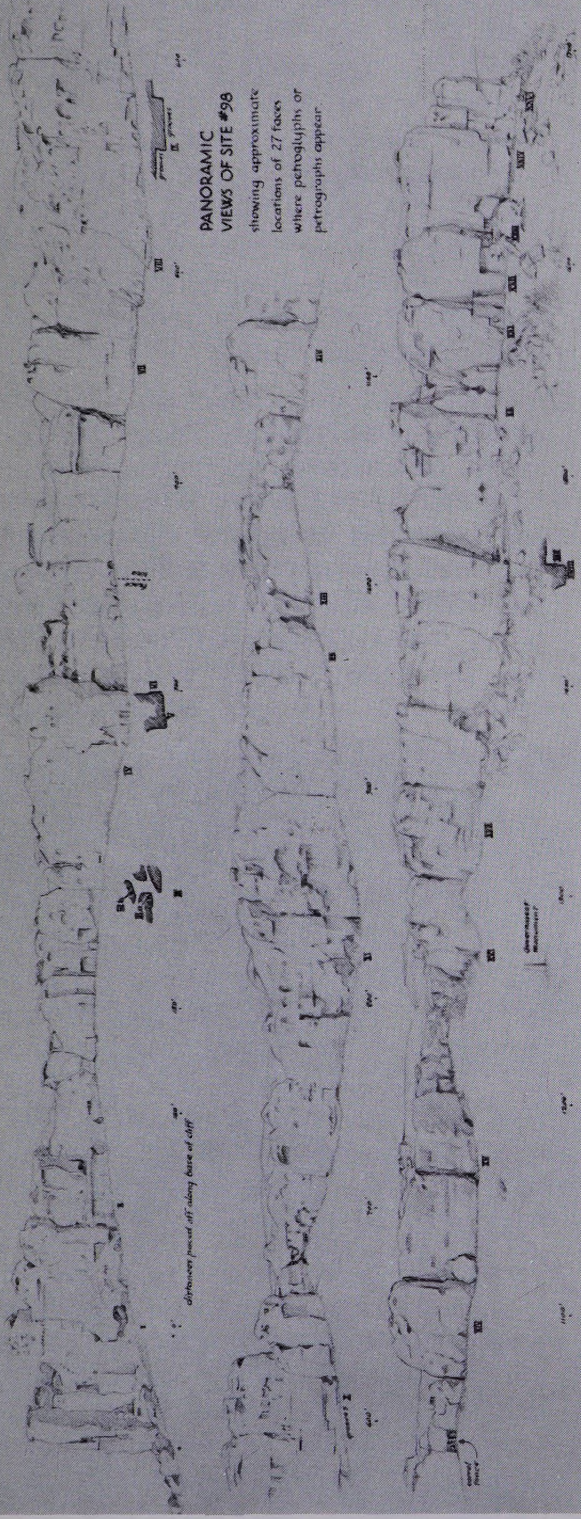
"No doubt this has been done by wandering war parties who have recounted their coups or feats of war or horse stealing and inscribed them upon these rocks."

This view on the origin of the writings is also shared by Selwyn Dewdney, the art teacher-archaeologist, who worked with the Glenbow Foundation in Calgary. Mr. Dewdney feels that the writings are representative of festive occasions and have religious significance.

Dewdney, along with the Glenbow Foundation, has done extensive archaeological research in the area. He has divided the drawings into three distinct archaeological groups.

(1) Early — beginning before 1650:

Animal	Human
Naturalistic	Pointed Shoulder
Archaic	



PANORAMIC
VIEWS OF SITE #98

showing approximate
locations of 27 faces
where petroglyphs or
petrographs appear.

KEY TO CONVENTIONS USED

For black and white scale drawings of
the petroglyphs on sites #98 and #99

deep grooves (width 1/2" to 1")
petroglyphs (not drawn and
hatched pattern)

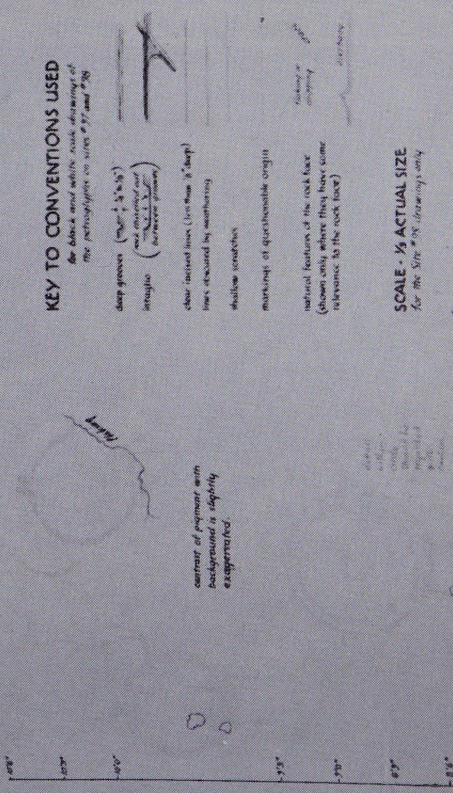
clear limited lines (less than 1/2" deep)
lines indicated by hatching
shallow scratches

markings of questionable origin

natural features of the rock face
(shown only where they do not seem
relevant to the rock face)

SCALE - 1/2" ACTUAL SIZE
for the size of the drawings only

(THE FOLLOWING FIVE PAGES SHOW THE PETROGLYPHS
AT VARIOUS STAGES OF REMOVAL FROM THE ROCK FACE
RECORDED BY REYNOLD TWENTY, JULY-AUGUST, 1940)



MAP

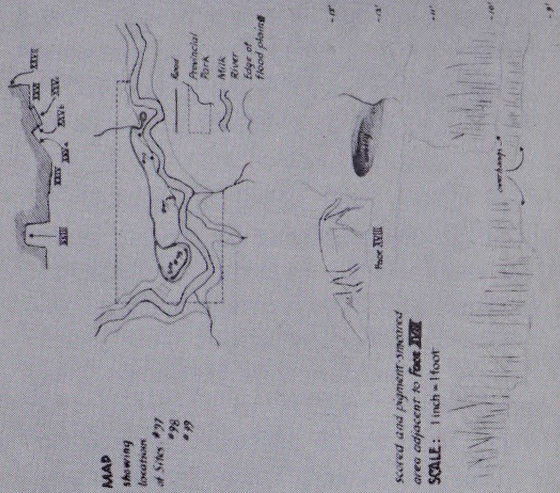
showing
location
of Sites #97
#98
#99

PETROGLYPHS
ON FACE 200

exposure 574.5

scored and pigment-removed
area adjacent to Face 200

SCALE: 1 inch = 1 foot



(2) Middle — beginning before 1700:

Animal	Human
Boat Form	Shield Bearer
	Pointed Shoulder

(3) Late — beginning before 1760:

Animal	Human
Mature Horse	Bow and Hourglass
Early Horse	Bodies

The dating of these drawings is reasonably accurate and is based upon the appearance of certain symbols in the petroglyphs. The horse appeared on the southern prairies about 200 years ago. There is evidence of Hudson's Bay Company spear points in some of the writings; thus these petroglyphs are no older than 175 years. Trade goods made their appearance on the prairies about 1760, i.e. guns, spear points. All of the above signs can, therefore, be used to give relatively accurate dating of most of the sites.

There are a number of legends surrounding the origin and history of the writings. There are legends carried on by the white man and Indian alike, as both are baffled and awed by the weird and wonderful shapes of the sandstone cliffs.

The grotesque cliff shapes have easily lent themselves to many an overzealous imagination.

Most of the legends are mere hallucinations, but many are based partly or possibly, even wholly upon truth. The authorities have long since departed, therefore, who is in the position to judge right from wrong.

Indians when visiting Masinasin (Indian name for the Writing-on-Stone area) used to climb up to the top of the large rocks to offer gifts to the Great Manitou.

Major Bagley in his book, "The '71 Mounties", also states an interesting legend. A large group of Indians set out on a buffalo hunt. They were successful in the hunt, but were overtaken by a blizzard and took refuge in the Writing-on-Stone canyon. Taking shelter below

the rocks, they recorded the hunt, but all perished before the storm abated.

Another theory put forth by Professor J. W. T. Spinks, from the University of Saskatchewan, states that remnants of the Yuma Indian Culture were found near Saskatoon and that it is possible that these people may have migrated into the Southern Alberta region.

Others think that perhaps the Malayo-Polynesians drifted across the Pacific Ocean to British Columbia and, finding a mountain pass, migrated into the Milk River area at the end of the first millennium A.D.

The Rev. John MacLean, in 1896, quoted one old Indian, "who told of a youth, who left his party and advanced to the stone and traced with his finger the wonderful writing which the spirits had made thereon. While thus engaged his whole body was seized with trembling, weird voices were heard in the air, the ground shook with a violent tremor and a feeling of helplessness took possession of the group".

As it can be seen from the above, many Indians felt that spirits lived in the valley and were responsible for the writings.

In the summer of 1950, several of the oldest Indian braves from the reserve at Browning, Montana, were brought to Writing-on-Stone to see how they would interpret the "pictures". One old fellow grunted, one said "Old", and the third said "Much Hungry". However, the latter statement may have referred to his own condition.

Fact or fiction, legend or truth, who is in a position to judge? There is no recorded information regarding the origin or meaning of the writings. The only criterion we have to go on is legend, conjecture or educated guess; all of which is theory rather than truth.

Extensive defacement has occurred at a number of the sites due to the fact that many people did not know what was actually recorded on the rocks and because of the easy access to some of the petroglyphs.

An example of damage is the defacement at site 98. The Glenbow Foundation has recorded each picture (face) and given it a number. For example, face 1 is located only 35 paces from the road and is eight feet above the path level. The individual facings' condition is shown on a chart included with this article (page 13).

Face 1 is stained red and it is thought that the red earthen pigment is similar to that found at the Paint Pots at Marble Canyon. Some people feel that the Indians brought the pigment from these Paint Pots down the Sundance Canyon to the Milk River area.

This first site, present day Indians say, tells a story of two braves who were brothers. It was a year of famine and the buffalo herds had disappeared. One day they finally spotted a herd with one fat bull in the middle. Both shot at the same time and the animal was mor-

tally wounded. Both brothers claimed the kill as each arrow found a vital spot. Enraged at each other, they fought until both dropped dead.

The Battle Scene is in excellent condition, possibly due to its inaccessibility. However, some erosion has occurred, but the scene can still be seen clearly. The drawing consists of thirty men with guns, forty-five other human figures, twenty-one teepees and nine horses, all concentrated in a single integrated composition within a space of twenty-five square feet. This one scene is a good example of 18th century Indian rock drawing. Obviously both the horse and the gun had become a familiar part of the Indian's way of life. Dating of this scene was based upon the meeting of two modifying factors. From the south came the horses and from the east the firearms. These two items made their appearance on the prairies about 1740-1760. The site of the Battle



Scene is easy to reach, although a person must walk about one-half mile to the area from the road.

Legends, theories and mysticism shroud the origin and meanings of most of the petroglyphs. Many of the nation's leading archaeologists have been completely baffled as to the origin of this art form and are still seeking out answers to the questions, "Where did they come from and what do they mean?" The complete truth has been lost forever, long before the white man came to the area. Therefore, possibly mysticism and legend is the only answer to these questions.

With the opening up of the west came the North West Mounted Police. Eventually, the law was established in the Writing-on-Stone area.

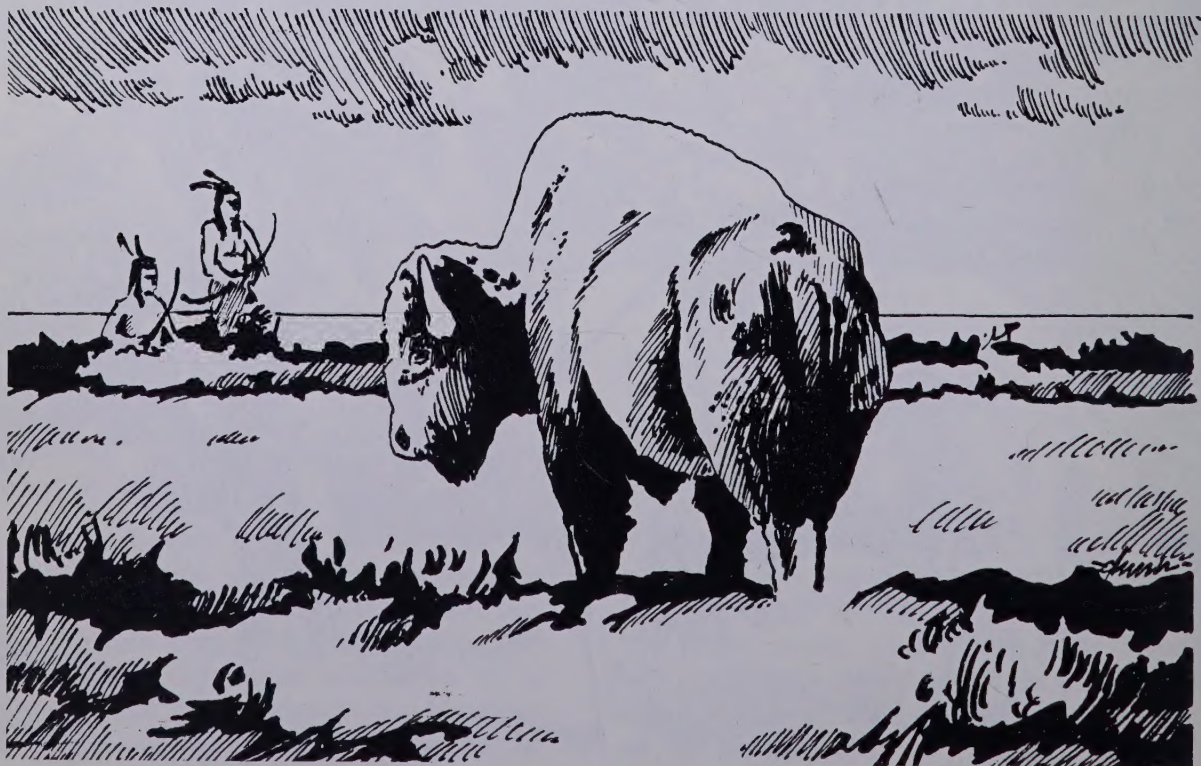
Originally the N.W.M.P. were stationed in Lethbridge in 1886 and 1887. Superintendent Steele of "D" Division was directed to select points for detachments along the Canada-U.S. Boundary and on March 28th, a patrol started across Kipp's Coulee to Milk River, from there to Writing-on-Stone and then to Pendant d'Orielle. The Writing-on-Stone detachment consisted of one

sergeant and six constables. The barracks were built in the spring of 1889 on the south bank of the Milk River at the mouth of Police Coulee.

Communication with other areas was limited in the early days of the post. The only route of travel was a small trail which extended from the site of the post southwest down the coulee for about one-quarter of a mile and then through a breach in the sandstone cliffs. Once the trail reached the summit it then branched west to Coutts and east to Pendant-d'Orielle. The small trail was the only route in or out of Writing-on-Stone post.

At the mouth of the trail, which leads to the summit above Police Coulee, can be found a sandstone cliff upon which most of the men stationed at Writing-on-Stone have carved their names. These names are still in excellent condition and are readily viewed from the site at which the Coutts Trail cuts through the coulee wall. Some of the names date back to the establishment of the post.

The barracks were built of local cottonwood and clinked with plaster. The main room was 16 x 24 feet with a



kitchen and lean-to coal shed. The logs were cut about six miles up the coulee and "snaked" down by horse. There was also a blacksmith shop 18 x 24 feet with a mud roof. A shingled lean-to was erected to house an officer and the non-commissioned officer in charge of the detachment plus a corral 36 x 24 feet, four rails high, with a shelter at one end. A good storehouse 20 x 16 feet with stone walls and a board roof was completed to keep oats and saddles.

Due to the resourcefulness and interest shown by Alva Blair and Myron Verburg of the Milk River district, the original police barn was found to be located approximately five miles south of its original site. The barn is in good condition, as it has been placed on a sandstone slab base and protected from the weather by building paper and shingles. Mr. B. Laackman of Milk River donated the barn to the Provincial Parks Division in order that the N.W.M.P. site can be reconstructed.

Unfortunately, all that now remains of the fort at the present site is the hole which marks the location of a cellar and an old well shaft about 30 feet northwest of the barracks site plus an old sandstone water trough used by the horses at the post. The barracks were completely destroyed by fire in 1916, although at that time much of its usefulness was limited because of the decrease in rustling across the border.

The main function of the detachment in the late 19th century was to patrol the area from the Milk River south to the border, being on the lookout for cattle rustling.

The O'Hara Brothers of Milk River, related how large herds of cattle were stolen as far south as Arizona and driven north through the Writing-on-Stone area. The "Redcoats" had the job of attempting to maintain the boundary and apprehend any men found in the act of rustling cattle. This proved to be exceptionally difficult due to the number of cattle grazing and the deep coulees that rib the area.

It was reported that two horse thieves from south of the border led

a merry chase from Montana into Police Coulee, where they holed up in a cave. The desperados felt that once they crossed the border into Canada that the U.S. officials would be dubious about executing their duty outside of the United States. This was a fatal mistake. The U.S. lawmen surrounded the rustlers and killed both in a gun fight. Therefore, this cave in Police Coulee was appropriately called "Horse Thieves Cave".

The N.W.M.P. were also responsible for the local distribution of the mail to the early homesteaders. It was recalled by the O'Hara Brothers that the mail was transported from Coutts to the post with the bimonthly supplies. At the barracks the mail bags were uncereemoniously dumped upon the floor and all the local residents would have to search through the pile for their own correspondence.

Another duty of the Writing-on-Stone Detachment was the control of illegal liquor sale and smuggling.

Smuggling of American liquor into Canada was very widespread at the turn of the century. Bourbon whiskey was selling at \$38.00 per case in Montana and resold for \$60.00 per case in the Lethbridge area, so it was only natural that some of the dried out farmers tried their hand at smuggling. The area around Writing-on-Stone was particularly well suited for this type of pastime. The smugglers would bring the liquor to the border by horses and then proceed to carry the smuggled goods down the various coulees into the park area. These coulees provided the necessary cover and were exceptionally difficult to patrol. Thus only a small percentage of the smugglers were apprehended.

As the post at Writing-on-Stone was destroyed by fire in 1916, it did not play any role in the restriction of illegal liquor traffic after that date. However, rum running still continued through the various coulees running into the area, therefore, the Coutts Detachment took over patrolling of the area.

During the period from 1900 to about 1930, many moonshiners carried

N.W.M.P. Detachment,
Writing on Stone, 1897



INDIVIDUAL FACINGS — WRITING-ON-STONE PROVINCIAL PARK

Face	Distance from Previous Face	Height Above 1960 Path Level	Amount of Defacement	Accessibility	General Condition
I		8' to 11'	Extensive	Good	Poor
II	50'	3'9" to 4'9"	Extensive	Good	Poor
IIIa	150'	4' to 4'8"	Extensive	Good	Poor
IIIb	20'	2'9" to 3'3"	None	Good	Very Good
IV	60'	4' to 4'9"	Extensive	Good	Poor
V	5'	4'6" to 7'	Moderate	Good	Fair
VI	4'	3'6" to 7'	Extensive	Good	Fair
VII	Could Not Locate				
VIIIa	50'	3' to 4'	Light	Good	Good
VIIIb	50'	1'6" to 3'	Very Little	Good	Very Good
IX	50'	2'5" to 3'	Moderate	Good	Fair
X	5'	2' to 2'5"	None	Good	Good
XI	225'	5' to 6'	Moderate	Good	Good
XII	130'	3' to 5'4"	Extensive	Good	Fair
XIII	25'	3'3" to 4'5"	Very Little	Good	Good
XIV	100'	2'5" to 3'9"	Very Small Amount	Good	Good
XV	Could Not Be Found				
XVI	100'	3'9" to 5'	None	Good	Very Good
XVII	50'	2'9" to 3'6"	Extensive	Good	Fair
XVIII	125'	12' to 12'6"	None	Fair	Excellent
XIX	5'	8'10" to 9'7"	None	Fair	Excellent
XX	75'	17" to 19"	Abrasion	Good	Very Poor
XXIa	50'	7'	None	Good	Very Good
XXIb	12'	5' to 4'2"	Very Little	Good	Good
XXII	20'	3' to 4'	Very Little	Good	Good
XXIII	Could Not Be Found				
XXIV	30'	75" to 85"	Very Little	Good	Good
XXV	12'	3'9" to 4'5"	Very Little	Good	Good
XXVI	20'	5' to 8'3"	None	Good	Excellent
XXVII	10'	4' to 5'	Very Little	Poor	Good

out their illegal business in the many caves in Rocky Coulee and Police Coulee. These caves were joined by numerous paths and trails to aid the moonshiners in transporting their supplies and products to and from the area. The police force tried to control this illegal production of liquor, but, at many times, to no avail. Many a cowboy sold his horse, saddle and chaps to initially buy into the various "companies". With the money obtained he would then buy brown sugar in the States and smuggle it across the border.

Constable Paddy White maintained it was the moonshiners that burnt down the post. After the "Redcoats" moved out of the post, the moonshiners reduced the post to rubble and thus removed a threat to their livelihood.

After the police left the area, the bootlegging and moonshining in the caves increased and the "firewater-makers" were less hindered in their movements. It was recalled that the whiskey was aged in barrels which were lashed and sunk into the river. Aging that would normally take months took only days and went relatively unnoticed.

For a period beginning in the '20's

and until 1932, there was a reverse in liquor traffic. In the elections Canada voted "wet" and the United States "dry". Therefore, the traffic reversed direction and Canadian liquor moved into the U.S. via the same routes as were used at the turn of the century. Horse-drawn buggies were initially used and later cars took over.

Police Coulee and the N.W.M.P. Detachment at Writing-on-Stone have seen many historical events occur. This area can be truly called the "Golden West". There was the coming of the settlers, and the mounted police. Social events, smuggling, cattle rustling and a multitude of other events have occurred at the park's site. Murders, gun fights and Indian raids are all part of the history that was Writing-on-Stone.

References:

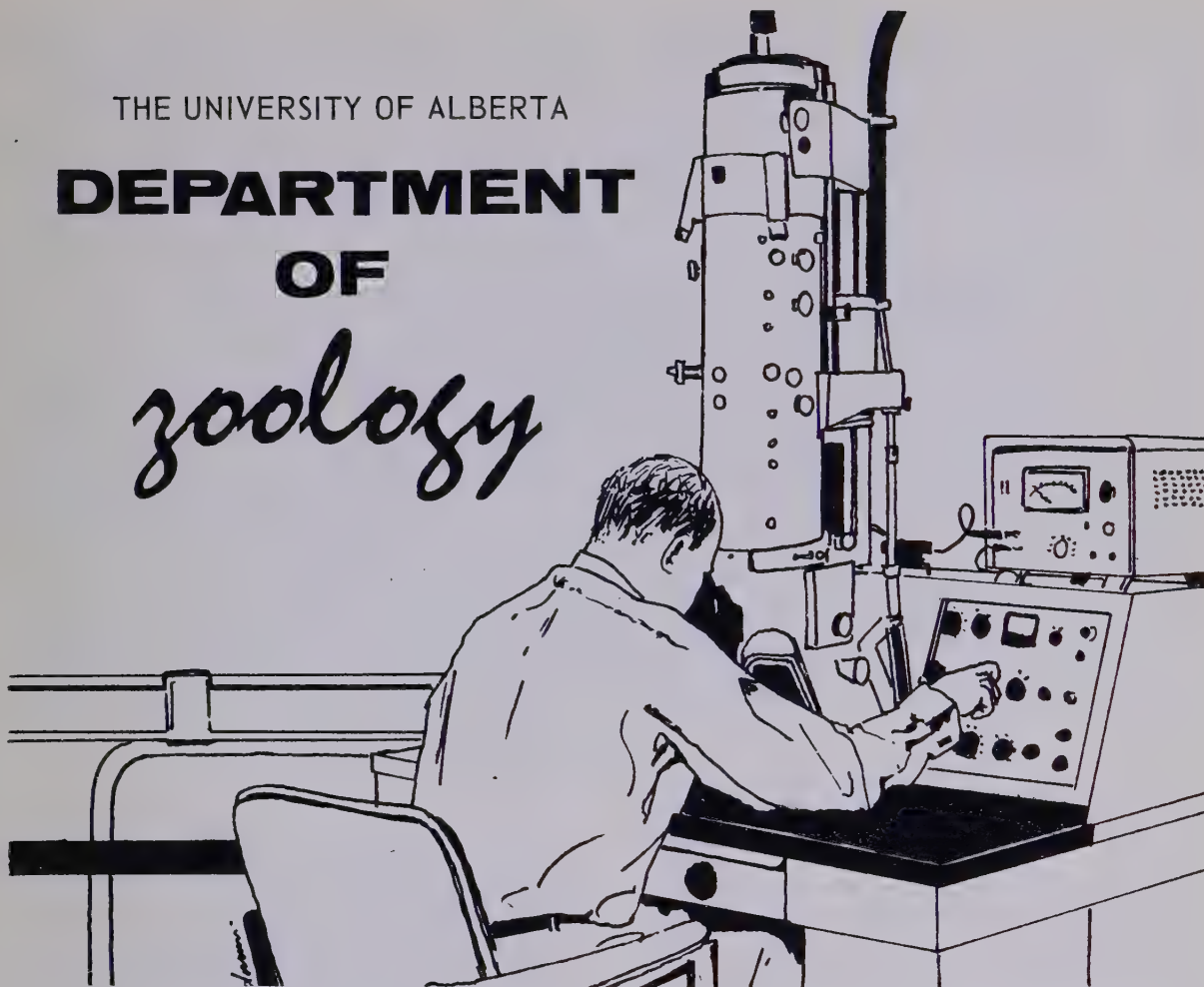
- a) The History of the Border County of Coutts — 1890-1965.
- b) The Lethbridge Herald — August 7, 1961.
- c) The Beaver — Winter, 1964.
- d) Milk River County.
- e) Calgary Herald — June 7, 1967.

Rum Running . . . the other way.



THE UNIVERSITY OF ALBERTA

DEPARTMENT OF *zoology*



BY J. R. NURSALL, HEAD, DEPARTMENT OF ZOOLOGY, UNIVERSITY OF ALBERTA

Ever since it was founded in 1921 by the late Prof. William Rowan, the Department of Zoology of the University of Alberta has played an important part in the study, conservation and management of fish and wildlife resources in the province.

The University of Alberta has always been deeply involved with the interests of the people of the province. The Department of Zoology has reflected this interest. From the first it has been strong in ecological studies. It has had an enviable reputation for training undergraduate students for higher degrees elsewhere. It has also been important in pre-medical training.

In the mid-50's the department comprised four members. Then, with the rest of the university it began to grow rapidly in response to the burgeoning needs of Albertans. Today there are 19 professors teaching and doing research in most of the fields of zoology.

Now 65 graduate students are taking training towards higher degrees. Graduate students in zoology, as well as being from Alberta and all the other provinces of Canada, have come from Great Britain, the U.S.A., India, Pakistan, Hong Kong, Taiwan, Japan, Guyana, the West Indies, Mexico, Nigeria, Australia, Poland, Austria, the Netherlands, and other countries. Scientists have been attracted here as post-doctoral fellows to do advanced research after getting their doctoral degrees from the U.S.A., the U.K., Pakistan, Czechoslovakia and New Zealand.

The department teaches more than 2,000 undergraduates every year. There are three people employed during the academic year to administer the undergraduate laboratories and the 50 or so graduate student teachers. More than 20 technicians, clerks, stenographers and lab assistants are needed to support all the people in the department.

A full-time administrative assistant looks after the non-teaching staff. In the Biological Sciences Building now under construction, an eleven-storey wing will be needed to house zoology.

Let us look at the sorts of things the department is involved in.

Drs. D. M. Ross (who is also Dean of Science) and G. O. Mackie work chiefly with marine organisms. The studies of animal behavior made by Dr. Ross are recorded on film; two of his movies were shown at Expo 67 in the series **Insight 67**. Dr. Mackie's research with jellyfish is giving information about the very simplest sorts of nervous systems, which has important implications for our understanding of the origin and function of our nervous systems.

Dr. S. K. Malhotra is expert with the electron microscope, with which magnifications of 50,000 - 70,000 X are possible. With this instrument remarkable new understanding has been gained of the structure and functioning of the smallest cells of the body. Dr. Malhotra was trained in India, at Oxford and at Caltech.

Dr. H. F. Clifford works with small aquatic organisms in freshwater. He studies the biology of the animals that make up a world of their own in lakes and streams and are so important as food of fishes. He is also an ardent fisherman. Dr. Clifford has special interest in the streams in muskeg. He has worked in cooperation with Alberta Agriculture on blackfly control with pesticides, and Canada Public Health on water pollution in the National Parks.

Dr. J. R. Nursall is also an aquatic biologist. His students have studied Lac la Biche and Beaver Lake, a number of the pothole lakes around Edmonton, and the power reservoirs on the Kananaskis River (see "The Kananaskis Fishery", *Land-Forest-Wildlife*, No. 2, 1962). Other students of Dr. Nursall work at Great Slave Lake, with the Fisheries Research Board of Canada.

Drs. Fuller, Lewin, Steiner, Zwickel and Boag are the people most concerned with the bird and mammal populations.

Dr. Fuller joined the department after 12 years experience with the Canadian Wildlife Service in the Northwest Territories and Yukon. His main interests are still in the ecology of the north, in particular the effect of winter on mammals. The biological station at Heart Lake, developed by Dr. Fuller near Hay River, N.W.T., is a year-round center of research into northern ecology. Dr. Fuller is an executive member of the International Union for the Conservation of Nature, whose headquarters is in Geneva, Switzerland. He is also a project leader for the International Biological Program, a world-wide cooperative venture into problems of biology. He had close relationships with scientists of similar interests in Scandinavia and the U.S.S.R. Fuller is spending the winter of 1967-68 in Finland, working with Finnish biologists studying ecological problems in the north of Europe.

Dr. Victor Lewin spent 1966-67 on sabbatical leave in Hawaii, studying game birds of the islands. His prize-winning studies of "Quail in California" have been followed up by investigations of quail in interior B.C. and by studies of Ruffed Grouse at the R. B. Miller Biological Station near Turner Valley. Dr. Lewin is also interested in the animals of the Milk River valley; he has made numerous collections on the Ross Ranch south of Manyberries. In 1962, Dr. Lewin wrote a discussion of cyclic fluctuation in animals which was published in *Land-Forest-Wildlife*, No. 5.

Andre Steiner joined the department from the University of Montpellier, France, after a year in Canada at l'Universite de Montreal. Dr. Steiner is a noted authority on the behavior of wasps. Now he is turning his attention to mammalian behavior. He divides his research time between the R. B. Miller and Heart Lake Stations.

Dr. F. C. Zwickel joined the department in 1967 from the University of Oregon. His interests are with game birds and large mammals, in particular how their population numbers are controlled.

David Boag is an Albertan who re-



J. R. Nursall close to his work.

turned to the department after obtaining his Ph.D. in the U.S.A. He acts as Director of the R. B. Miller Station, named after the late Dick Miller, Department Head, 1956-59, and jointly supported by the University and the Alberta Department of Lands and Forests. Dr. Miller founded the station for his stream trout studies in 1950. Dr. Boag is chiefly interested in the fluctuations in numbers of grouse. Specialists in grouse studies from all over western North America meet periodically at the Miller Station to compare and plan further work.

The department has a strong physiology group. Dr. C. P. Hickman established a laboratory on Lac Ste. Anne, where he worked on the adjustments fish make to water of different temperatures and chemical content. At Lac Ste. Anne several species of fish can be caught and studied as close as possible to natural conditions, winter and summer.

Dr. D. D. Beatty is interested in fish, primarily in their vision and the biochemistry of their eyes. While all vertebrate animals see in about the same way, there are chemical differences in the sensitive retinas of their eyes; these are among the important

differences between species of animals. Dr. Beatty has been particularly involved with the trouts and whitefishs.

The way in which mammals adapt to cold is the special field of research for Dr. John Hayward. He has found that bats are very good for the purposes of his study. His efforts to collect bats have brought him something of a reputation as "Batman" around Edmonton, but his interests in the physiology of cold are much wider; he and his students are looking at many different kinds of animals. His work is closely related to some of the other northern and winter studies under way in the department. Dr. Hayward chaired an international conference on cold adaptation held in November at the University of Alberta.

Dr. Jean Lauber works chiefly with birds, examining the effect of light on their development. Her investigations into the development of the eyes has led her to cooperative ventures with the university's ophthalmology department of the Faculty of Medicine.

There is also considerable medical interest in the experiments of R. F. Ruth. Dr. Ruth is delving into the establishment of immunity reactions in animals, that is how animals establish

resistance to such things as disease organisms. At the present time Dr. Ruth keeps his experimental chickens in the Chemistry Building. Chemistry lectures are sometimes hard put to explain the barnyard noises emanating from nearby rooms. Science takes many forms.

Dr. Sara Eisenberg Zalik came to Edmonton from Mexico. She, too, is a physiologist, being most interested in the embryonic development of animals. Painstaking experiments with single cells the leading to new knowledge of the processes of growth.

The theories of growth, cancer, and the coordinated functioning of organisms form the field of activity of Prof. Ludwig von Bertalanffy, a world-famous theoretician, who came to Canada from Vienna after the war and who has held a joint appointment in the Departments of Psychology and Zoology since 1961. He alone has published 10 books and over 200 articles, in several languages.

Parasitology is as important to wildlife and fishery biology as it is to veterinary science. Drs. John Holmes and Jerome Mahrt concentrate on this field. Their presence in the department makes it one of very few in North America that is primarily directed towards seeking out and understanding the parasites that sometimes infect fish and game, as distinct from the parasites of domestic stock. Pioneering work has been done by these men and their students, particularly with waterfowl. The control of swimmer's itch is also a project of interest to Dr. Holmes. During 1967-68, Dr. Holmes is on leave at the University of Washington Marine Biological Laboratories at Friday Harbor, Washington, where he is extending his studies to parasites of marine animals.

Richard C. Fox is a paleontologist, an expert in fossils, appointed jointly in Geology and Zoology. His field work takes him to the Red Deer River valley, where he combs through the extremely rich fossil beds, seeking traces of the earliest mammals, which were just beginning to appear when the Age of Dinosaurs was at its height. Most people look for the gigantic remains of the great reptiles, but Dr. Fox's patient hunt for tiny teeth and bones has led

to the discovery of hundreds of previously unknown specimens.

These are the staff of the Department of Zoology. You will find them all over the province studying the problems that face us and looking for the answers that will be useful to everyone everywhere. They are helping the A.G.T. control rodents that nibble on underground communications cables; they are working with the National Parks Service to improve recreational conditions in Astotin Lake, Elk Island National Park; they cooperate with the Department of Indian Affairs to investigate the game requirements of Indians at Habay; they aid in the inventory of Alberta's Renewable Resources and help represent Alberta at national and international conferences on resources, pollution, conservation and management; they are utilizing the most advanced and efficient instruments and techniques in their researches and are building an enviable reputation in Canada as a center of scientific excellence. If you meet up with them, you will find them willing to talk and to trade information or anecdotes. There is much to do and to find out; each one is eager to pursue his interest until he gets as near to the complete answer as possible.

Graduates of the department have posts in game and conservation agencies across Canada. At least six of the senior scientific officers of Alberta's Lands and Forests Department have degrees from the Department of Zoology. Others are working in universities and game departments in countries around the world.

At the present time there is a great need for trained biologists across Canada. With carefully designed and comprehensive undergraduate and graduate programs, the Department of Zoology is working steadily as one of the three leading departments in the country to increase biological knowledge; to help fulfil Canada's requirements for trained scientists; to assist in the conservation and management of our renewable resources and by these means and in co-operation with the Fish and Wildlife Division and other agencies to ensure the pre-eminence of Alberta as a sportsman's wonderland.

Survival...ENEMIES



BY PAUL J. PRESIDENTE, HUNTER TRAINING OFFICER,
EDUCATION AND INFORMATION BRANCH

Many advances have been made in the development of clothing, equipment, rations and in the development and techniques for their use. However, regardless of how good the equipment and techniques are, the man lost is faced with a situation which has to deal with himself. Man's psychological reactions to the stresses of the situation often makes him unable to cope and utilize his available resources.

While much of this information could

be labelled common sense, it should be remembered that common sense is based on training and past experience and adjustments to many situations. One of the foremost psychological requirements for a lost outdoorsman is the ability to accept immediately the reality of a new emergency situation and react properly to it.

Survival training has been taught in many ways ranging all the way from lecturing in classrooms to putting stu-

dents into a fairly similar predicament and letting them work their way out. Other methods include the use of classroom training aids (such as films and displays), and practice sessions with actual equipment as well as drills to develop basic skills. Properly handled, each of these methods adds to the effectiveness of Survival Training Programs. In general however, the closer the training comes to the real thing, the more effective it is. Another key to effectiveness, which is very important, is motivation. The more the student is made to want to learn, the more he will learn.

Survival training personnel use the term that "survival training is like life insurance, you never require it until you need it"; however, life insurance does not guarantee a chance of extended life, survival training does. The trained outdoorsman will be prepared at all times and be capable of surviving in circumstances, which others might perish.

WHAT TO DO IF LOST

Stay put and do not panic. Keep busy, however do not overwork yourself. The sooner you admit to yourself that you are lost and "swallow your pride", the sooner you will be found. Once a camp is established, it should not be abandoned. Stay put unless you finally realize where you are and where you are going. If the camp is abandoned, a note should be left at the camp advising of your intentions.

When lost, a major psychological factor is fear. Fear is a very normal reaction for any man faced with an emergency situation. Fear influences man's behaviour and his chances for survival. There is no advantage in avoiding fear by denying the existence of danger. The most important point here is that fear

should be accepted as a perfectly normal reaction rather than a shameful one. How the individual will react to fear depends more on himself than on the situation. It is not always the physically strong or "happy-go-lucky" person who most effectively handles fear. Timid or anxious individuals may respond more coolly with the situation.

THE SEVEN ENEMIES

There are seven enemies of survival that immediately take effect. Once fear and panic sets in — ; then follows pain, cold, thirst, hunger, fatigue, boredom and loneliness. These seven enemies may attack singly or in teams. They are more dangerous than they look and their effects should be known and met. Owing to familiarity, these enemies are apt to be ignored, however, psychological reactions to these enemies tend to contribute to panic.

Pain:

Pain is Nature's way of making you pay attention to something that is wrong with you. But nature also has ways of holding off pain if you are too busy doing something else to pay attention to the injury right then. In the survival situation, pain, hunger, etc., may go unnoticed if the individual's mind is occupied with plans for survival. Should he forget those plans his chances are very poor. The point most important is that a special effort must be made to keep hopes up and to keep working for survival. On the other hand, once given into, pain will weaken the drive to survive. Pain can get the best of you if you let it, even if it isn't serious or prolonged.

Cold:

Cold is a much greater threat to survival than it sounds. It not only

lowers your ability to think, but also tends to lower your will to do anything but get warm again. Cold is an insidious enemy; at the same time, it numbs the mind and the body and the will to survive. Because it is hard to move and you want to sleep, you can forget your goal . . . to survive.

Thirst:

Thirst is another enemy of survival. Even when thirst is not extreme, it can dull your mind. But, as with pain and cold, thirst can be almost forgotten if the will to survive is strong enough. It is also important to remember not to unnecessarily deprive oneself of water. Serious dehydration may occur in a survival situation even when there is plenty of water available.

Hunger:

Hunger, as thirst, is dangerous in the survival situation because of the effects it can have on the mind. Primarily in lessening the individual's ability for rational thought. Both thirst and hunger also increase the individual's susceptibility to the weakening effects of cold, pain and fear.

Fatigue:

Because it is almost impossible to avoid some degree of fatigue in the survival situation, it is necessary to understand its effects and so allow for them. Even a very moderate amount of fatigue can reduce mental ability. Fatigue can make the individual careless — it becomes increasingly easy to adopt the feeling of just not caring. This is one of the biggest dangers in survival. Many people mistakenly think that fatigue and energy expenditure are directly related. This confused notion may be responsible for many deaths in survival situations. Certainly, there is a real danger of over-

exertion, but fatigue may actually be due to hopelessness, lack of goal orientation, dissatisfaction, frustration or boredom. Fatigue may represent an escape from a situation which has become too difficult. This is why it is important to understand its nature. If the individual recognizes the dangers of a situation, he can often summon the strength to go on.

Boredom and Loneliness:

Boredom and loneliness are two of the toughest enemies of survival; they are bad mainly because they are unexpected. When nothing happens, when something is expected and doesn't come off, when the individual must stay still, quiet and alone, these feelings creep up on him.

The main objectives to survival is a preparatory or state of readiness — in other words, being trained mentally and physically for survival, should the need for such action arise.

The endangering aspect of survival is the one most frequently encountered, "it can't happen to me".

In conclusion it should be mentioned that survival in Canada is nothing new; we have had races of people on a continuous survival situation for hundreds of years.

The author, Paul J. Presidente, is at present the Hunter Training Officer for the Education and Information Branch, Department of Lands and Forests. Prior to his employment by the Provincial Government, Paul was the Commanding Officer of the Royal Canadian Air Force, Survival School, Namao, Alberta. He has over 30 years of flying experience and spent a great deal of time in Canada's north.

His next article will deal with "Fire Methods".



SNOW
COMMANDER

the Fire Bomber

BY C. F. PLATT, SUPERVISOR OF FIRE CONTROL, ALBERTA FOREST SERVICE

Much has been written about the fire bomber in North America. It was born of desperation with no time for careful planning or proper evaluation. Since its inception, reports and opinions have varied from excellent to poor, with the most desirable types of bombers being quoted as from the Stearman to the Martin Mars. Straight water or water with various additives have been dropped on fires both large and small with varying degrees of success. To date little work has been done on proper systematic evaluation of the actual results of the fire bomber on wild fires.

It has become obvious that there is a real need to evaluate the use of this equipment in Alberta from an economic and operational point of view. To this end a project was started in the spring of 1967 by the Federal Forest Service, in co-operation with the Alberta Forest Service who are conducting a program in the Edson Forest. The purpose of this program is to evaluate just what we accomplish by dropping "slurry" from the air and how the best results can be

obtained both by flying techniques and mixing know how. Along with the research program, considerable work has been done by Mr. G. H. Geale, Fire Protection Officer, of the Edson Forest on Bomber Base Organization and mixing problems.

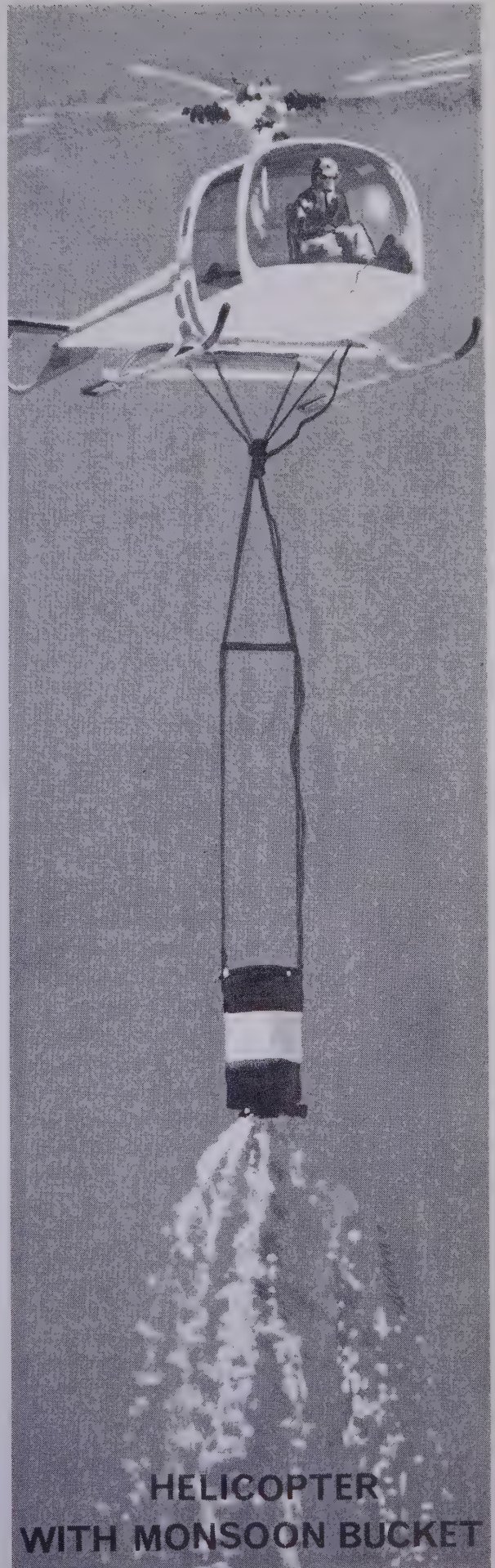
The fire bomber is only one of many tools at the disposal of the Forest Fire Control Staff. The more sophisticated and complex tools become, the greater the necessity to train people to use them properly and efficiently. For the purpose of this article, when considering fire bombers, the air crew will not be included, as the training of these people is outside the authority and jurisdiction of the Forest Service. It must be assumed that these people are competent in their particular phase of the work. Very often tools in the hands of the inexperienced or untrained not only are useless, but can even become a liability. With this in mind, it is vital that we should consider all aspects of how to properly and efficiently utilize this equipment.

The types of aircraft used in Alberta to date for dropping slurry and water are as follows:

1. The Stearman
2. Snow Commander
3. PBY Canso (amphibian)
4. Mitchell Bomber
5. Gruman Avenger
6. Helicopter

The small bombers of the Stearman size carry insufficient payload. This has been recognized for some time and resulted in the research and use of the larger airplane, the Snow Commander. Most smaller types of bombers require a well organized and efficient ground supporting organization with which they are then able to give flexibility and coverage, being able to attack several small fires at once. For areas where lack of general development and great distances, ground support is difficult, the "skimmer" or amphibious larger aircraft is more desirable. These aircraft have the advantage of being able to work away from the main base for four or five hours and pick up water from the closest lake to the fire. One of the main drawbacks to this type of aircraft is the cost if sufficient numbers are to be on hand to attack several fires simultaneously.

Like many other useful firefighting tools, the best and most efficient results can be obtained by using the bomber on small fires. The Alberta Forest Service subscribes to the small fire concept and in line with this thinking, the bomber is a most useful tool. Even when the bomber is employed on larger fires, its main capability and usefulness is on "hot spots" and restricted areas which threaten to break out; these are, in effect, small fires on the perimeter of a large one. Some of the earlier hopes in fire bombing were to lay down long, effective fire guards ahead of large fires and literally eliminate the need for a lot of ground work. While this technique has, in some cases, been used with success, particularly with the lighter types of fuel occurring in the dry areas of the United States, it is not likely to achieve



**HELICOPTER
WITH MONSOON BUCKET**

CANSO





much success in the timbered areas of this Province. Our forests include a wide variety of fuel, thereby causing a very erratic fire behaviour, prone to jump guards which are laid down ahead of it. It is quite possible that the technique of laying a guard ahead of the fire line with a bomber could be successfully used in lichen or "caribou moss" or relatively lighter fuels. Such a technique could easily break down, however, if some fuels were mixed in with this type of cover.

During the past fire season of 1967, seventy-six fires were successfully attacked by fire bombing action. While we know that we are achieving certain results with the fire bomber, there is a very definite need to know just precisely what results and if these can be improved by changes in equipment or techniques. To this end, drop reports are required and are vital to fire bombing improvement.

SMALL BOMBER

In order to achieve the maximum use of this valuable tool, it is necessary to follow certain procedures and standard methods. One of the basic, self-evident factors of delivering slurry to a fire is speed and volume. In the area covered by our smaller bombers, we are fortunate enough to have a large number of airstrips, 117 in total, and roads, thus allowing a fairly sophisticated ground-air operation which is greatly dependent on surface transportation. There are, however, some strips which, of necessity, are not accessible by acceptable roads and these must be taken care of by air transport. At the present time the service is utilizing standard fuel caches as bomber bases which work quite well as experience indicates that small bombers should not extend their operations further than 20 to 25 miles from a base.

Consideration has been given to suggestions toward a more centralized operation of the small bomber, thus achieving a more efficient and sophisticated operation at fewer places. This basically reduces itself to one common denomin-

ator, that is how quickly can the bomber be loaded and how long does it take to make the return journey.

To work out this relatively simple problem, let us assume a bomber's speed at being 120 miles per hour or 2 miles per minute. With a maximum recommended distance of 20 miles from base, this would give the bomber turn around time as 20 minutes with the addition of time required for taxiing, take-off, and loading. At present it would appear that this portion of the operation takes up to 6 minutes to complete, thus making a total turn around time for a bomber at the extreme range of 20 miles, 26 minutes. If the ground time of the bomber could be cut in half, this would have the effect of increasing the circle of coverage by 3 miles. The increasing of the distance to fires merely has the effect of decreasing the number of available bombers on a given fire. Observations made in the field indicate in some cases bombers are taking as long as one hour turn around time which, in effect, cuts a 4 aircraft fleet to 2 when considering the amount of "mud" delivered per hour. It is obvious that any attempt to over-centralize bomber operations will have the effect of decreasing the fleet, or increasing the turn around time which is the same, with no corresponding compensation in saving of time at the base of operations, as there is only 6 to 8 minutes per aircraft in total to work on.

What construction organization doing a gravel hauling job would fail to work from the gravel pit closest to the job, provide adequate organization at the pit in the interest of quality and keep close check of the loads both as to numbers and just where they were being delivered? A bombing operation from airstrips requires that these same simple fundamentals be satisfied.

ORGANIZATION

One of the biggest problems facing the use of fire bombers is preparedness of bombing bases in all respects. This breaks down into two basic phases: (1) the maintenance and proper upkeep of

the airstrip and facilities and ((2) the availability of properly trained crews to function during times the bombers are in use.

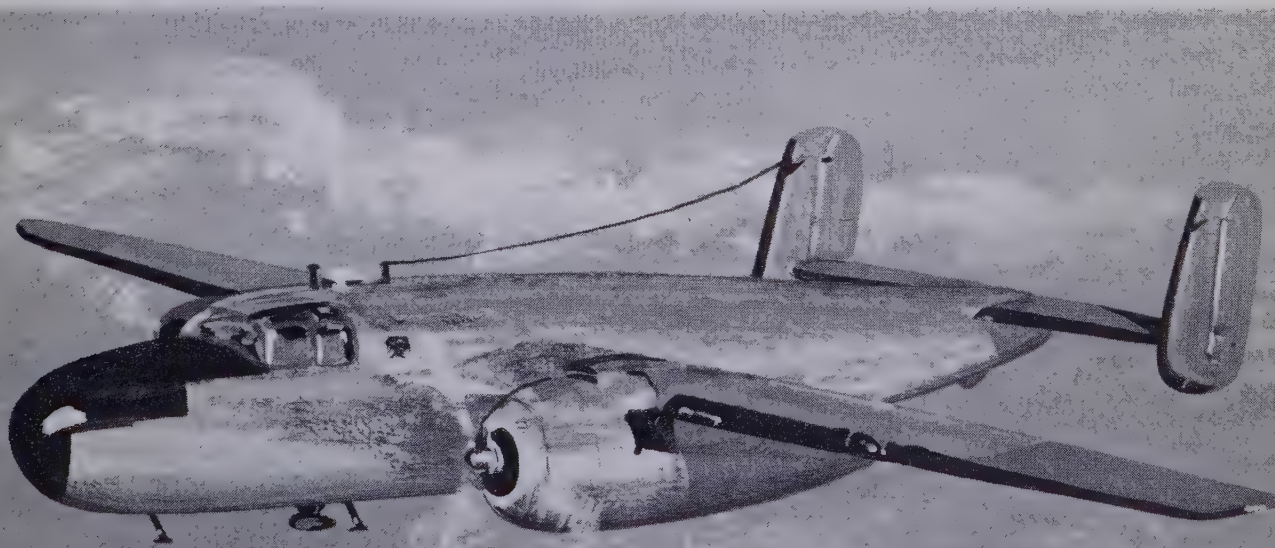
One of the big problems facing us in the airstrip maintenance areas is achieving a sod or grass on the runway. Often due to the type of sod, this is difficult, however, all possible means are explored thoroughly which includes obtaining professional advice from the Department of Agriculture on the matter. Condition of runways have to be clearly established in the spring and fall and at any other time when passing close by, particularly if there has been adverse weather conditions which may have caused a change since the last inspection.

When the runway is located at a bomber base, the next important item is water supply. We now know that it is very difficult to achieve the necessary pressure to properly mix "Gelgard" when attempting to relay water over long distances. It is, therefore, necessary to obtain a water supply immediately adjacent to the runway. In some cases water tank trucks have been utilized at airstrips which are readily accessible by road. Due to the fact that many of our airstrips are not on a dependable road and trucks are not assured, this type of water supply cannot be planned on.

There are several possibilities regarding the storage of water; the more primitive approach being that of a pit lined

with polyfilm and covered with some crude form of cover to assist in shade, thereby cutting down on evaporation. The more expensive approach is by building a large tank similar to large cattle watering tanks or the more attractive method of picking up, at a relatively low cost, surplus tanks from the oil industry that provide very large gallonage for storage. The water pits may be left in winter, but it is obvious that any above-ground tank must be drained in the fall to prevent severe damage by frost. Again there is the need for systematic servicing (a) to assure the tanks are properly filled in the spring and (b) to ensure drainage in the fall prior to freeze-up. There is no substitute for having the water already adjacent to the runway, allowing the use of light, portable fire pumps or any other pumping equipment which may be at hand. If the tank has a reasonably large capacity, sufficient water can be stored to sustain a bomber operation long enough to move in any extra equipment or larger pumps which may be required for relaying water over longer distances to refill the tank. In addition, to the requirements of runway conditions and water supply, there is the obvious necessity for inspection and check of the quantities of aviation fuel and properly placed supplies of Gelgard or any other additive which may be in use.

In the operation of fire bombing, there are two clearly defined areas



B-25 MITCHELL



STEARMAN

of authority and responsibility. One is that of the air crew and the other is of the fire control organization. There should be no conflict or overlap or confusion regarding the area of responsibility in this operation. The pilot and engineer are responsible for the proper and safe maintenance and operation of the aircraft. This is the area in which all their energies should be directed and no interference with their work should be allowed. In the second area, that of fire control, the person in charge of the fire has the full responsibility for the successful conduct of suppression. The air crew should, in no way, interfere or influence the people responsible for this phase of the work. As a simple example: the bird dog officer and the bird dog pilot working together should, while working as a team, know their areas of responsibility. The pilot is able to advise the bird dog officer as to the safe delivery of the "slurry" on the fire and the bird dog officer directs the pilot as to where and how often the "slurry" is to be delivered. There should be no orders from the pilot to any fire control crew, nor should there be any orders by the bird dog officer to the pilots of the bombers. Another simple illustration of the two areas of responsibility is that of a fire burning in high mountain country with gusty winds. The pilot of the bird dog aircraft should be requested to evaluate the situation and advise if he feels it is safe to attempt bombing at all. It could be that he advises the fire

may be approached from one particular direction only. If, in the opinion of the bird dog officer and the fire control people on the ground, the approach advised by the pilot will not provide proper or useful attack on the fire, the fact that this is the only approach to the fire should not influence the attack pattern and a decision to not go ahead with bombing would obviously be made.

LARGE BOMBER

The large bomber which has been left to last, but far from being considered least appears to offer much in the way of the useful tool in fire suppression areas which are under developed and involve long distances. The skimmer type amphibious aircraft appears excellently adapted to this problem as it has relatively long flight duration, built-in Gelgard injectors, and can fill itself with water in a very short period of time from the lake closest to the fire; again total turn around time is important as with the small bomber. This aircraft is in effect a complete bombing unit in itself and is self-sustaining as long as its fuel lasts.

There are some definite problems involved in the use of these aircraft. A bird dog is definitely necessary to insure complete effectiveness of the aircraft and operations this past year indicate that the built-in Gelgard injection system leaves much to be desired. It is obvious that if the Gelgard injector is

not working satisfactorily a considerable amount of the proper effect of the water drop is lost. Other problems which arise with the Canso in particular are that the nose wheel door is subject to distortion and damage and the wing tanks often spring leaks and high winds also reduce this aircraft's effectiveness. These old, obsolete military aircraft are, considering their age, doing an excellent job and maintenance problems must be anticipated in excess of that which would be expected in a relatively new or modern type of aircraft. Another problem with the large bomber is that it is economically impossible to have as many



units on hand as the smaller bombers, thereby making it difficult to attack as many small lightning strikes simultaneously as a fleet of smaller aircraft.

One of the big advantages of the larger bomber is that when not actually bombing fires it can be used for hauling freight or personnel. A sonar survey program has been under way in the north half of the Province for some time in an effort to ascertain the depth of most

of the lakes from which the larger bomber may be expected to operate. This will give pilots a reasonable chance to make a knowledgeable decision on picking up water or landing his aircraft on a lake, thus increasing the safety of operations. There is no doubt anyone who has been involved in a Canso base operation promptly discovers that this aircraft can cause a real logistics problem as it uses gasoline and oil in very large quantities and requires a well organized base from which to operate if it is going to function efficiently and give the best value. The rather obvious main advantage of the amphibian skimmer type large bomber is it eliminates the need for ground supporting organization, other than at base camp, which is really not involved in the actual bombing and is more a refuelling and servicing base for the aircraft. The Canso, in general, may be considered as being able to work away from base for four to five hours, possibly returning toward noon, being refuelled and re-serviced and going out for another four or five hours in the afternoon. This gives it a rather large working day. Generally pilots agree that flying a Canso from 6 to 7 hours a day on fires is a very large day indeed and four or five such days consecutively would probably necessitate a relief crew. One important point is that while these aircraft are amphibious, the crew do not like to leave the aircraft overnight on water. There is a rather obvious problem here; the hull of the aircraft, like that of any boat which has taken somewhat of a beating during operations, has a tendency to spring leaks and while these do not bother the aircraft during actual skimming operations or temporarily setting on water, leaving the aircraft overnight will result in sufficient water seeping into the hull so as to require pumping out procedure. It is necessary, therefore, to have a reasonably good airstrip from which this aircraft makes its main base of operations.

The larger land based bomber such as the Mitchell B-25 requires much the same type of ground organization for support as that of the Snow Commander.

The main difference being that the machinery involved has to be much larger and more sophisticated and is more difficult to obtain on an assured basis as promptly as normal bombing operations require. At lower altitudes the B-25 requires at least a standard DC-3 strip and if working to an altitude above sea level of 4,500 feet, it is estimated that 5,000 feet of runway is necessary. We are also informed by people in the aviation business that on gravel runways the B-25 is subject to considerable propeller damage which would be quite costly to the operator on a sustained operation. These factors limit the use of this bomber on a planned basis. However, it could be useful (such as this past summer) when a shortage of bombers is experienced and a campaign fire situation exists where there is time to set this machine up with the proper organization and support at a strip of sufficient size to allow a safe operation. It must be borne in mind when using a machine of this type that the fact it needs a fairly large strip to work from may often prevent capitalizing on its additional speed and heavy payload by virtue of working longer distances. It is not intended to use this type of aircraft on a regular planned basis. However, if its limitations as well as its good points are thoroughly understood, it can always be used under the right set of circumstances to an advantage.

HELICOPTERS

Our experience with water drops by helicopters is limited and the need for more evaluation and field experience is necessary. During the past season a "monsoon" bucket attachment was tried out with some success. This equipment allows a small helicopter to pick up 40 to 45 gallons of water and drop it on a small spot fire or into a "harodike" or relay tank.

The greatest value appears, at the present time, to be in high country. A helicopter can knock down dangerous small spot fires in inaccessible places or deliver water into small storage places for filling back packs, often being

quicker during initial action than setting up numerous power pumps and relay tanks.

Again there are some points to consider. If a bomber with "slurry" can get into a hot spot, it should be able to do as good a job at least for less cost.

If it is possible to set up relay pumps with spares on hand, such a system will work regardless of weather or visibility which is not the case with the helicopter.

When you tie up a helicopter on this type of work, other valuable uses may suffer.

The fire bomber is here to stay. It is, no doubt, one of the most valuable tools placed at the disposal of a Forest Service to date. It is only by careful evaluation, training, and increased efficiency in the use of fire bombers that we will be able to realize the full benefits from this type of equipment. In the past, the use of the bomber in North America has too often represented a completely disorganized expenditure of large sums of money. We must do our best to avoid a situation where bombers are delivering slurry in a haphazard manner, often bombing fires which do not require it and missing the fires which need the slurry. Often fires are knocked down by bombers and valuable time gained is eventually lost because no ground forces were moved in to consolidate the advantage obtained by the bomber. Improper communications result in unsystematic delivery of slurry and the lack of bird dog officers has resulted quite often in movement of large amounts of slurry with very little results to show for it. Like any other tool, the bomber is as good or as poor as the organization supporting it, and in spite of its great advantages, the limitations of the fire bomber must be realized to avoid misuse of this equipment. As is the case with the bulldozer, the power pump, and other valuable tools, the bomber is not a cure-all and only forms part of the total inventory of valuable firefighting tools where each has its place and its use and in many cases one is required to support the other.

By GEORGE MITCHELL

The temperature stood at zero and a miserable southwest wind etched intricate patterns on the snow, piling it into deep drifts here and scouring it down to clear ice in other places.

Walking under the railway trestle on the northeast corner of Lake Wabamun, the staccato rattle of dried bulrush protested the unrelenting wind. I lined out for a spot on the lake that was approximately three hundred feet south of the second trestle dragging a small toboggan loaded with gear.

My fishing partner for the day, C. W. "Red" McNicoll, was plying me with a stream of questions. Finally arriving at what I thought was the place to cut out the first hole, "Red" wanted to know, "Why here?"

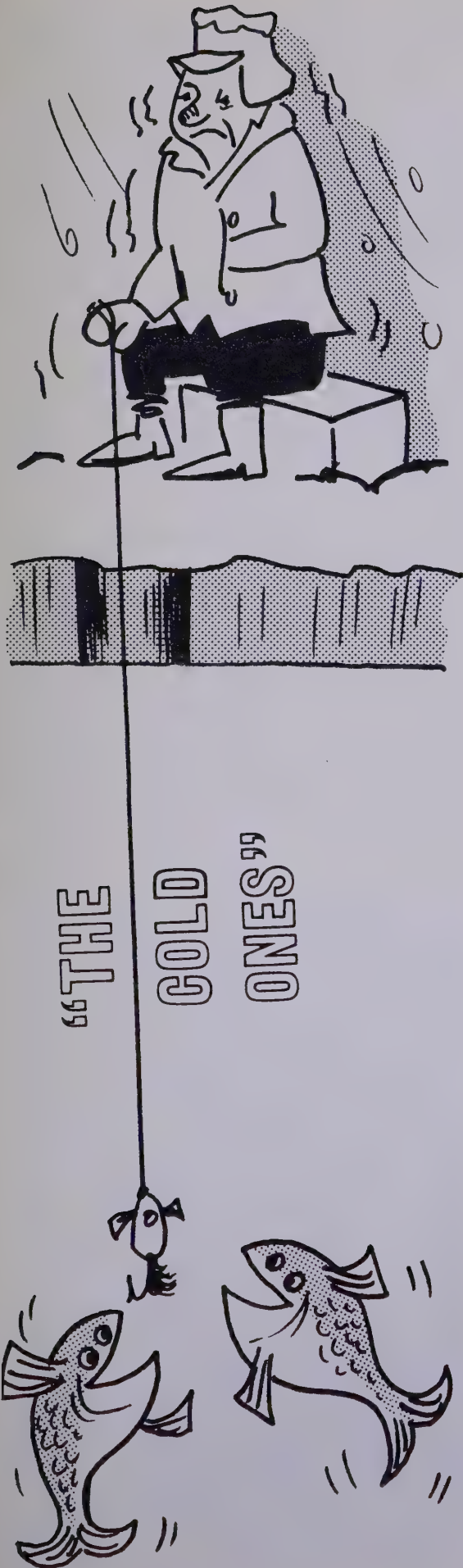
My only reply being, "This is just about as good a spot as any".

"Well then, why did we not stay closer to shore?"

I marked off a square approximately nine feet square, and told him to get busy with the shovel. This would help cut down on the questioning.

From past experience I knew that a sandbar was located here, covered by eight feet of water. While Red was busy with the shovel, I got busy with the auger to cut the first hole. As my eight-inch bit inched lower, I wondered if it would ever break through. It did, at twenty-four inches. Using a skimmer, I soon cleared off the ice chips and lay down to see what the depth was. It was just right, with six feet or so of water under the ice. Clear sand patches and some low bottom weed made the bottom show up clearly. Cutting another hole three feet from the first, we soon had a nine by nine "palmetto" tent set up covering both holes.

Taking all the gear into the tent, except the toboggan, we soon had waterproof sheets on the six-inch snow cover that we had left for insulation. After covering the sheets with a warm wool blanket, we were now ready to get down to the business of fishing. Putting a match to my alcohol stove, we were able in five minutes to remove our heavy parkas and mitts and were



fairly comfortable. What a difference a thin skin of canvas can make.

Handing Red one of my short jigging sticks with eight-pound test monofilament for line, to which was attached a small shiny Russian lure, I gave him some instructions on how it must be jigged. I was using six-pound test line with a whitefish jig, blue tinsel body with yellow maribou stork feathers for trim, my favorite both winter and summer. When we got covered up with an old black raincoat to shut out the light, the lake bottom stood out clearly. The ice at the top of the hole being pale blue to almost a purple shade at the bottom. As soon as we got jigging, the whitefish were there. Some going by the hole with a steady pace that indicated that they had other things on their mind; "Travellers" we call them. Others made a pass at the lure and missed, or we pulled too fast in excitement and missed them, or we did not pull quick enough, and they had taken the lure and ejected it before we woke up.

When the whistle announced noon at the Calgary Power Plant, we had three whites in the corner of the tent. Red had many bites on his Russian lure, but through inexperience he missed most of them one way or another, knocking two or three off when they struck the ice around the hole. We also stopped for lunch, but not fishing, for we sat cross-legged like a pair of Eskimos jigging with one hand and eating sandwiches and sipping coffee with the other. I foul hooked one under the jaw with the whitefish jig. He just happened to be going by when I jigged up.

We covered up again and all through the afternoon they came in ones and twos, and at times more. Once I made the remark, "There's one", and Red asked, "Which way was he going?". I said, "West". This brought a great deal of laughter from Red, who remarked that he had his nose within an inch of the water for hours and did not know up from down, never mind east from west.

Three times during the afternoon, we each got one at the same time, and succeeded in getting them onto the

blanket. The long, lean shape of a Northern Pike moved within six inches of my jig, looking it over. His pectoral fins flapping much like the wings of a bird. He then saw the flash of Red's shiny lure, and a flick of his tail moved him from my view. I asked Red if he was going to bite. He replied, "No, he is going back your way". Reaching over, I picked up a heavy line to which a half wave wobbler was attached. Dropping this into the sand, I jigged it until it kicked up a puff of sand. I got a jarring strike, and then Red shouted, "I got one, too". But all he had was me. I dragged three tangled lines out of the hole, with a mean looking "jack" attached.

By four o'clock, we had fourteen whitefish in the corner of the tent, and it took us another thirty minutes to get the last two to make our limit of sixteen fish.

We found on this day as I have on many others, that when you see the fish approach the hook, if you just shake your hand to make the hook shimmer and pulled it up slowly at the same time, they will usually take the hook. The time to set the hook in them is a critical moment. I do this when I see the white of their mouth as they open it to suck in the hook. A sharp twitch of the hand is all that is needed, keep the line taut and get them to the hole as soon as possible. If hooked through the tip of the nose they are yours, for the nose on whitefish is tough and rubbery.

As we stepped from the tent, the lake was covered with cars, trucks, ice fishing shanties of every description, and many lumps of humanity covered up with all manner of coverings looking down holes and jigging.

When we got home, we put the "whites" on a scale and they went 27 pounds and 3 ounces. Where in North America can a man get better ice fishing than this, and only forty miles from home? All fishermen agree that half of the fun is looking down the hole and trying to entice them to take the hook. This I feel is where the real interest in fishing for the whitefish comes in. First you can see the fish that you are after and your lure at the same time. To my

knowledge this is about the only type of fishing where it can be done.

I can look back on twenty years of ice fishing in the vicinity of Edmonton. When I first started, we only fished for pike and yellow perch on such lakes as Wabamun, Lac La Nonne and Devils. It was unusual to see a dozen fishermen in a day, even on a large lake like Wabamun. There just appeared to be very little interest in fishing through the ice.

About 1961, Mr. Jim Nelson of Devon, Alberta, discovered that he could catch the Lake Whitefish with a small lead headed jig that he had developed. The news soon leaked out and the rush was on. It has snowballed to the extent that on any decent day, it is not unusual to see a thousand people fishing—from the main pier at Wabamun down to the trestle, a distance of one mile. The whole surface is covered with cars and trucks. While fishing shanties have been constructed to make fishing more comfortable and to shut out the light, many of the fishermen still prefer to lie down on the ice and jig with their nose a short distance from the water;

others just sit on a camp stool and jig. When things were once proven at Wabamun on the whitefish, it soon spread to Pigeon and Hanmore Lakes. Now, it is not unusual to see fishermen driving 150 miles to Moose Lake, north-east of the city or the same distance to Fickle Lake, southwest of Edson; something unheard of when I first started fishing through the ice.

Fishermen are taking a great number of whitefish, far more than a casual glance will show. For the past three falls, I have been engaged in running whitefish derbies at Wabamun. Some of the boats have filled out their limits and are headed home by noon. I saw one party of three one day that caught their limit of 24 fish in 45 minutes. This goes on day after day in the fall and all through the long winter. It does not slacken off in the spring anymore, for the fish bite good until about July when the warm surface water forces them out to deeper water. They can also be caught here if you wish to jig deep for them.

Once the ice is solidly formed, the lakes are fairly safe for at least five months. Wabamun is an exception, for the warm water discharged from the Calgary Power Plant causes ice conditions to be unnatural on this lake and allowances must be made or you stand a chance of breaking through.

What at one time was considered a sport for the most hardy, has now spread to being a real family recreation. But it took a fellow like Jim Nelson to wake us up to the fine recreation of ice fishing. Fishing that we have had in our back yards and overlooked for years. I wrote a series of articles for various publications when this new type of fishing came to light. I also received a lot of correspondence, wondering if I was wrong. One fellow even went as far as to inform me of the scientific name of the Lake Whitefish, for he thought that I had them mixed up with the Rocky Mountain Whitefish. Just like a lot of other things that we think unsurmountable, nothing is impossible if attacked at the right angle; not even (*Coregonus Clupeaformis*) — the Lake Whitefish.



The author with a couple of "Whities"



NON-RESIDENT MOOSE HUNTING IN ALBERTA - 1967

BY S. B. SMITH, DIRECTOR, FISH AND WILDLIFE DIVISION

This report summarizes information collected by Fish and Wildlife Division staff in northern Alberta, together with returns from 1,000 questionnaires sent to non-resident moose hunters after the end of the hunting season. A more detailed analysis on some aspects of the questionnaire is still under preparation, but this report contains most of the essential information concerning the 1967 season.

Prior to the 1967, hunting season in the Province of Alberta, the kill of moose by non-resident hunters was negligible. The only licences available to non-residents for the taking of antlered animals were \$150.00 non-resident alien and \$75.00 non-resident Canadian big game licences and a \$15.00 whitetail deer licence. On the big game licences, a hunter could take goat, sheep, grizzly and black bear, and an antlered moose, caribou, elk, or deer, and an antlered whitetail deer on the deer licence. Almost all of the non-resident hunters were involved with outfitters in mountain areas, where moose densities are generally low. In addition, moose as trophies are rated lower than sheep, goat or elk by those hunting in the mountains. About 100 moose were killed

each year in the mountainous areas. Thus it might be said that prior to 1967 Alberta was not well known to non-residents as an area with high potential for producing moose.

Late in August, 1967 advertisements were placed in nine newspapers in the northwestern United States, drawing to the attention of American hunters that a new \$25.00 licence was available for non-resident hunters. The new licence was also available to Canadians from provinces other than Alberta, but was not advertised in Canada. Response to advertisements in the U.S., was immediate and heavy. During the month of September alone, over 10,000 enquiries were received. In total, more than 20,000 enquiries were processed and 9,927 licences eventually were sold during the open season, from September 1st to December 16th, 1967.

Prior to 1966, moose seasons in the northern portion of Alberta consisted of long seasons on antlered animals, with generally conservative seasons on antlerless moose. In 1966, most of northern Alberta had a season on moose of either sex from September 1st to December 17th. In 1967, the season extended from September 1st to December

16th, during all of which time moose of either sex (antlered or antlerless) could be taken in Big Game Zone 1, where moose were known to be lightly harvested.

Table I shows the number and percent of non-residents by state of residence who hunted moose in Alberta in 1967, together with the time spent in Alberta and the number of days actually

TABLE I. Number of Hunters and Time Spent in Alberta by Non-Residents Hunting Moose in 1967

State of Residence	Number of Hunters	Per Cent Hunters	Average No. Days in Alberta	Average No. Days Spent Hunting
Washington	5,926	59.8	7.3	4.8
Oregon	1,221	12.3	7.3	5.0
Idaho	377	3.8	8.2	4.8
Montana	864	8.6	7.0	4.5
Others	1,539	15.5	8.3	4.9
TOTALS	9,927	100.0	7.5	4.8

spent hunting. The heavy preponderance of hunters from the State of Washington (59.8%) probably reflects strong newspaper publicity in the Seattle - Tacoma area, following initial television and radio programs publicizing the availability of the new 1967 non-resident moose licence. It should be mentioned that the new licence also allowed non-resident hunters to take two black bears, but it would appear that this inducement was of minor importance. Only 31 black bears were exported by non-residents hunting on the special licence. From Table I it may also be seen that the average number of days spent hunt-

ing was 2.7 days less than the total time spent in Alberta. The difference can be accounted for in the time spent travelling to and from the hunting areas. It is apparent from Table I that all five categories of hunters had approximately a week to spend in the Province, out of which they were able to hunt about five days.

Table II summarizes information on expenditures by non-resident hunters. The average expenditure per hunter by state of residence and total expenditures by five categories of hunters provides an estimate of the total economic input

TABLE II. Expenditures by Non-Residents Hunting Moose in Alberta in 1967

State of Residence	Number of Hunters	Average Expenditure Per Hunter	Average No. of Days Hunted	Expenditure Per Hunter Day	Total Money Spent
Washington	5,926	\$141.21	4.8	\$29.61	\$836,810.46
Oregon	1,221	151.06	5.0	30.21	184,444.26
Idaho	377	111.57	4.8	23.24	42,061.89
Montana	864	162.88	4.5	36.20	140,728.32
Others	1,539	189.25	4.9	38.62	291,255.75
TOTALS	9,927	\$150.60	4.8	\$31.37	\$1,495,006.20

to various rural areas in Big Game Zone 1. Average total expenditure per hunter, for all groups combined was \$150.60, exclusive of licences and was estimated at \$31.37 per hunter-day. There were 9,927 non-resident hunters who hunted in Big Game Zone 1 in 1967. These hunters spent a total of \$1,795,000 in Alberta during their stay in the Province, including \$300,000 revenue to the Fish and Wildlife Division for purchase of licences.

Table III provides an estimate of the manner in which non-residents disbursed

their total expenditures in the province. Because of the regulation permitting hunters to hunt with an Alberta resident or by themselves if guides were not available, expenditures on guiding services represented only 13.3% of the average expenditure per hunter. Expenditures on gasoline and travel expenses and food and lodging were relatively high, which can be accounted for because most hunters entered Alberta through Banff National Park or south of that point, at least 350 miles from the nearest moose hunting area.

TABLE III. Expenditure by Items by Non-Residents Hunting Moose in Alberta in 1967

State of Residence	AVERAGE EXPENDITURE PER HUNTER				
	Food and Lodging	Gasoline and Travel	Guiding Services	Miscellaneous	Totals
Washington	\$48.29	\$47.45	\$17.08	\$27.67	\$141.21
Oregon	52.42	53.48	13.74	30.82	151.06
Idaho	45.52	40.28	6.58	17.29	111.57
Montana	67.27	48.54	18.73	28.18	162.88
Others	59.99	47.13	43.90	36.90	189.25
TOTALS	\$54.69	\$47.37	\$20.00	\$28.17	\$150.60

It is generally accepted that hunter success is higher in guided than in non-guided hunters. Table IV shows the number and percentage of successful hunters during the 1967 season. At the same time, by relating the expenditures of hunters to hunting success, an estimate is available as to the likely expenditure of non-residents if they were

required to hunt with a guide. The season in 1967 consisted of generally poor hunting conditions, with hot weather prevailing well into October and with very little permanent snow until mid-November. It would appear from Table IV that non-residents would spend considerably more money per hunter if they were required to hunt with a licenced guide.

TABLE IV. Success Rate and Total Expenditure for Non-Residents Hunting Moose in Alberta in 1967 (From 499 Respondents to Hunter Questionnaire)

Hunter Class of	Number of Hunters	Number Successful	Per Cent Success	Average Days Hunted	Average Expenditure
With Guide	98	56	57.1	4.7	\$213.00
With Resident	273	120	43.9	5.0	141.00
Unaccompanied	128	47	36.7	4.6	125.00

Data from 494 questionnaires and from export permits makes it possible to classify the moose kill according to age, sex and time. Chronology and classifications of the kill is shown in

Tab V, from which it may be seen that bulls, cows and calves comprised 44.0%, 42.6% and 13.4% of the total kill respectively. A total of 3,605 animals were taken by non-resident hunters in 1967.

TABLE V. Chronology and Classification of Moose Kill by Non-Resident Hunters in Alberta, 1967, by Weekly Periods, September 1 - December 16 (From 494 Respondents to Questionnaire)

	Number of Moose Killed			Totals
	Bulls	Cows	Calves	
Sept. 1 - 9	1	0	0	1
Sept. 10 - 16	0	1	1	2
Sept. 17 - 23	3	2	2	7
Sept. 24 - 30	10	1	3	14
Oct. 1 - 7	16	4	0	20
Oct. 8 - 14	16	8	5	29
Oct. 15 - 21	11	13	4	28
Oct. 22 - 28	10	14	1	25
Oct. 29 - Nov. 4	5	9	3	17
Nov. 5 - 11	5	10	3	18
Nov. 12 - 18	7	12	4	23
Nov. 19 - 25	3	8	1	12
Nov. 26 - Dec. 2	2	3	1	6
Dec. 3 - 9	3	3	0	6
Dec. 10 - 16	0	1	0	1
TOTALS	92	89	28	209

DISCUSSION

The initiation of a special non-resident licence in 1967 caused several unexpected results. The response to limited advertising (in 9 U.S. papers) resulted in a large rush of enquiries. All enquiries were answered and prospective hunters were advised of the regulations, length of season and areas where it was permissible to hunt, by provision of a brochure. The main difficulty arose when subsequent newspaper coverage in the U.S., gave the impression that northern Alberta was over-run with moose, and that the help of U.S., hunters was needed to control the animals.

An extremely rapid buildup of hunters seeking information and guiding

services, resulted in large numbers of American vehicles being seen in most towns in or near the border of Big Game Zone 1 wherever a district Fish and Wildlife Officer was located. Residents in those towns quickly became disturbed and gained the impression of a larger number of vehicles than actually were present. Within a short time, the availability of licenced guides or residents was exhausted, and an amendment to the regulations was passed, permitting the non-resident hunter to hunt by himself, if he signed an affidavit stating that he could not obtain the services of a licenced guide or a resident to accompany him on his hunt.

Under the Game Act it is illegal for

an unlicensed guide to charge for guiding services. It is apparent that unlicensed guides did however, charge for their services. In some cases, it is known that U.S., hunters booked hunts with licensed guides, but did not go with the guides when they found that they could obtain the services of a resident at a less expensive rate. This caused a hardship to some guides who were involved with moose hunting in Big Game Zone 1.

It is apparent that the Fish and Wildlife Division under-estimated the possibility of a large number of non-resident hunters coming to Alberta in response to advertisements for the special licence. It had been expected that 1500 - 2000 licences would be sold, but early in the season it became apparent that response was much heavier than anticipated. Virtually all big game areas in the northwestern United States and Canada were closed to hunting due to forest fire conditions except Big Game Zone 1 in Alberta, which may have contributed to the heavy influx of hunters.

SUMMARY

1. The \$25.00 Non-resident Special Big Game Licence initiated in 1967, resulted in the sale of 9,927 licenses between September 1st, when hunting began, and December 16th, when hunting ceased.
2. Non-resident hunters in Big Game Zone 1 killed a total of 3,605 moose during the season, for an average success rate of 36.2 percent.
3. From interviews with hunters, from field observations by Fish and Wildlife Officers and from hunter questionnaires, it is apparent that almost all moose were killed less than one-quarter of a mile from roads.

4. Expenditures by non-resident hunters in Alberta averaged slightly over \$150.00 per licence.
5. Total expenditures by hunters was \$1,795,000 of which \$300,000 was spent on licences, and \$1,495,000 was spent on food, lodging, travel, guiding services and similar expenditures associated with hunting.
6. The licence fee of \$25.00 appears to be too low, and as a result, too many non-resident hunters have become interested in moose hunting in Alberta, considering the number of available guides.
7. Heavier than desirable concentrations of hunters occurred in most areas where road access was good. Harvest of moose in more remote areas was negligible.
8. Availability of guides was very low in most areas, but where guides were available, they were generally booked to capacity.

Field surveys, both on ground and in the air, are in progress at the present time to determine the levels of moose populations in all areas of Alberta. No surveys to date have indicated any suggestion of overharvest of moose, thus the non-resident season did not materially effect the availability of moose, except immediately adjacent to roads.

If non-residents are required to hunt with guides in 1968, there will be an automatic limitation placed on their numbers, by the number of licensed guides available. In addition, guides will have their hunters off the roads, and a better harvest of moose will be achieved in areas not presently hunted. All licensed guides in Big Game Zone 1 should have sufficient bookings to keep them fully occupied during the 1968 season.

Priority System for Lands

BY C. E. PAQUIN, ADMINISTRATIVE ASSISTANT TO DIRECTOR OF LANDS

The Lands Division of the Department of Lands and Forests opened for settlement portions of Township 110, Range 15, 17 and 18, west of the 5th Meridian, last July, on a priority system. This township was surveyed in 1965 by Mr. George Palsen, A.L.S., well known and long time surveyor with the department. This was the last township to be surveyed by Mr. Palsen before his retirement.

Following the survey, considerable planning was done involving the Lands Division, Water Resources Branch of the Department of Agriculture and the Department of Highways, as well as a quarter by quarter inspection to determine suitability for settlement purposes.

Although newly surveyed lands are usually made available for settlement at intervals of one or two years, this was the first time that a priority posting system was used. This was designed to give local land owners first chance at obtaining homesteads to enlarge their present farms. All land owners of the area were given an opportunity to apply for sufficient land to give them a maximum of one section in combination with what they already own, provided the lands owned and applied for were all within ten miles of each other and that they were otherwise eligible.

A special Sub-Agency draw was held at High Level where eligible interested parties participated in draws to establish the order in which they could make

their selection. Twenty-seven applications were taken, made up of twenty half-section units, four three-quarter section units and three one-quarter units.

The priority period for local land owners continued until August 18th, and any lands not taken by then became available to the general public on August 21st.

The policy of granting a 30-day priority period to local land owners is being applied throughout the entire settlement (yellow) area of the province to complement the A.R.D.A. program of farm enlargement and consolidation.

Another feature of the opening of this township was the introduction of a policy designed to protect tree cover along certain designated streams and water courses. Successful applicants for lands affected by such water courses will be required to sign an agreement not to remove or burn off tree cover on certain designated areas along these streams except for the small portion that might be required to create an access from one side to the other. Grazing will be permitted.

In recognition of the limited use that will be available to the purchaser on these designated areas, the portions will be sold at a reduced rate. The policy of protecting stream banks and water courses by this method is being extended throughout the settlement and settled areas of the province.



Trophy Fishing in Alberta

BY DENNIS MACDONALD, FISHERIES BIOLOGIST, CALGARY

It was mid-August in the mountains of south-western Alberta but the cold rain pelting down offered mute testimony of the coming of autumn. Clouds were piled knee-deep in the Assiniboine valley while overhead the sun tried hopelessly to wrestle its way through. A chilly wind scraped its way across the glaciers and ruffled the waters of the tiny alpine lake. Then, as if by divine intervention, the rain ceased and the waters calmed. An angler arched his rod and softly settled a tiny black fly onto the lake's temporary stillness. The artificial gnat hesitated for a moment and then slipped slowly beneath the surface. Nearby, in search of food, two magnificent Cutthroat Trout cruised slowly along in the shallows. An eternity passed before one of the trout darted away from its companion to engulf the fly. In that split second, angler and trout challenged one another in a contest of intelligence versus instinct. The trout's fins flashed, the angler's eyes gleamed..., water splashed..., line screamed.

In twenty minutes the battle was over. A majestic scarlet-silver form slid silently into shore. Douglas Newton, of Calgary, bent slowly down to lift the largest Cutthroat Trout ever taken in Alberta from its icy home. It weighed 9 pounds, 8 ounces and measured 27½ inches in length. This fish won Mr. Newton an award for the largest Cutthroat Trout taken by an angler in North America in 1966.

Mr. Newton's good fortune was due, in part, to a chain of circumstances; not the least of which was his exceptional skill as a fly fisherman. But, like many of us, he was not immediately aware of the fact that he had captured a trout of record proportions. Certainly, to be sure, it was the largest Cutthroat Trout that he had ever seen. However, not realizing the special significance of his feat, he gave the fish to a young lad who was accompanying him on the trip. It was the youngster who had first brought the fish to Mr. Newton's attention. The boy had tried in vain to catch

it on his small spinning lure. Disappointed with his lack of success, he encouraged Mr. Newton to try one of his flies. The result is history.

After the trout was weighed, it was dressed and the youngster carried it proudly home. Here, fortunately, he deposited it in a freezer. As fate would have it, Mr. Newton's curiosity finally stimulated him to check a recent issue of a sporting magazine to see whether or not his fish was worthy of record recognition. To his chagrin, he soon realized that his Cutthroat Trout was indeed a creditable candidate for the magazine's annual contest. With a slightly quickening pulse rate, he contacted the lad to whom he had given the fish. To his relief, the youngster had not devoured it in the intervening two weeks. To make a long story short, the fish is now proudly displayed on the wall of the den in Mr. Newton's Calgary home.

The circumstances of this incident point out several factors that are presently influencing the trophy fishing records of today. First of all, unlike most hunters, few fishermen realize what standards make a trophy fish. Secondly, because of this, many trophy fish are lost annually in one of the following ways: fish are returned to the water without having their weight recorded, others are kept but never weighed, still others are weighed but never compared to the record listings. Lastly, many trophy fish are destroyed by the gutting or dressing process before they are weighed. In order for a trophy fish to be recognized, its whole weight must be recorded in the presence of reliable witnesses. *(In a future article, the correct procedures to care for and record a trophy fish will be outlined.)*

In this article, we shall review the existing Canadian and World records and propose similar records for Alberta. With regard to the latter category, it must be realized that, up until now, no central agency has ever accepted the responsibility of keeping game fish records for the Province of Alberta. For this reason, the Alberta records are subject to future revision as past records

become available. Anyone who can provide authenticated information on Alberta fish which exceed the weight of those cited in this article is urgently requested to forward their information to:

Director of Fish and Wildlife,
6th floor, Natural Resources Bldg.,
Edmonton, Alberta

ALBERTA, CANADIAN AND WORLD RECORD GAME FISH RECORDS

BROOK TROUT

(Salvelinus fontinalis)

In 1967, a fish from Alberta came very close to breaking one of the oldest trophy fishing records in existence. Don Jenkins, of Fort Smith, N.W.T., captured a 12 pound, 14 ounce Brook Trout in Pine Lake, Wood Buffalo National Park. It was only 26 ounces shy of the world record, 14 pounds, 8 ounce, squaretail taken in the Nipigon River, Ontario on July 21, 1915, by Dr. W. J. Cook. Mr. Jenkins' fish is one of a number of Brook Trout stocked in Pine Lake by the federal government in recent years. The lake has since yielded several large Brook Trout and a new world's record might very well be swimming around in the lake at the time of this writing.

Other notable Brook Trout captured in Alberta waters include a 10 pound, 8 ounce fish from Beaver Lake, Jasper National Park, and a 9 pound, 4 ounce fish from North Prairie Creek. The former trout was taken in 1943 by Dr. Tweedle and the latter by Norman McNamara on April 5, 1959.

BROWN TROUT

(Salmo trutta)

The largest Brown Trout ever taken in Canada was a 27 pound, 10 ounce fish taken in Witless Bay, Newfoundland, in 1960, by June Squires. The world record is a 39 pound, 8 ounce trout captured in Loch Awe, Scotland, in 1866, by W. Muir. Alberta's record Brown Trout is an 8 pound, 2 ounce fish taken from Obed Lake, near Hinton, in September, 1965, by William Shpeley. Mr. Shpeley also captured Brown Trout weighing 8 pounds and 7 pounds, 15 ounces in Obed

Lake the same fall. The largest fish was 26 inches in length and 16½ inches around its girth. Another trophy Brown Trout of 7 pounds was taken in the Elbow River, near Calgary, in March, 1967, by F. Rawcliffe.

The largest Brown Trout ever taken by any method is a 40 pound fish from Great Lake, Tasmania.

CUTTHROAT TROUT

(*Salmo clarkii*)

The world record Cutthroat Trout weighed 41 pounds and was captured in Pyramid Lake, Nevada, in December, 1925, by J. Skimmerhorn. The fish was 39 inches in length. The Alberta record Cutthroat is the fish previously cited in this article and it would appear that this fish is also the Canadian record.

DOLLY VARDEN TROUT

(*Salvelinus malma*)

The world record, 32 pound Dolly Varden Trout was captured in Lake Pend Oreille, Idaho, on October 27, 1949, by N. L. Higgins. The Canadian record fish, 29 pounds, was taken by W. Galliano in the Duncan River, B.C., on November 1, 1964. Both of these fish greatly exceed the weight of Alberta's largest Dolly Varden; a 14 pound, 2 ounce fish taken from an unnamed river in the Edson area, in 1949, by W. L. Yorke. Two other large Alberta fish are an 11 pound, 3 ounce trout from the Berland River, captured by E. Lingnau in 1961; and a 10 pound trout from the Wapiti River, captured by M. Brown in 1966.

GOLDEN TROUT

(*Salmo aguabonita*)

Grant Campbell, of Edmonton, captured a magnificent 4 pounds, 7 ounce specimen of this very beautiful exotic trout in Barnaby Ridge Lakes, Alberta, in June, 1965. Several other 3-4 pound trout were taken by other members of his party. This feat, while establishing a provincial trophy fishing record, also brought a successful conclusion to the attempts of the Fish and Wildlife Division to establish a sport fishery for this species in Alberta.

The world record Golden Trout is a 28 inch long, 11 pound fish taken from Cooks Lake, Wyoming on August 5, 1948, by C. S. Reed.

RAINBOW TROUT

(*Salmo gairdneri*)

There is some confusion regarding the present Canadian and world record listings in this category. Some authorities have classified Steelhead, Kamloops and Rainbow Trout as three separate species. Other authorities have combined the three under the single species *Salmo gairdneri*. The American Fisheries Society, an organization of fisheries scientists, recognize only one species in their "List of Common and Scientific Names of Fishes from the United States and Canada". Accepting their classification, it would appear that the present Canadian and world record Rainbow Trout is a 52 pound, 8 ounce fish taken in Jewell



Lake, B.C., in 1933, by a Mr. Schroeder.¹ Field and Stream magazine recognizes a 37 pound Rainbow Trout, from Lake Pend Oreille, as the present world's record. This fish was taken on November 25, 1947, by W. Hamlet. Other Canadian fish include a 36 pound trout caught in the Kispiox River, B.C., by C. B. Ewart in 1953 and a 29 pound, 8 ounce trout taken from Okanagan Lake, B.C., by R. Lecki-Ewing.

The record Alberta Rainbow is a 15 pound trout caught in Mami Lake on May 25, 1967, by W. Pashuk. This fish was 34½" long, 18" in girth, and is one of a number of large Rainbows produced over the years in Alberta's famous pot-hole trout fisheries. A 17 pound, 10 ounce Rainbow Trout was captured in the test nets of provincial fishery biologists in Reesor Lake, Cypress Hills Provincial Park in 1966.

LAKE TROUT

(*Salvelinus namaycush*)

The Lake Trout, like the Rainbow Trout, appears to be the subject of conflicting record listings. The fish presently recognized as the world's record by Field and Stream magazine is a 63 pound, 2 ounce Lake Trout taken from Lake Superior on May 25, 1952, by H. Hammers. It measured 51½ inches in length and 32¾ inches in girth. An 87 pound Lake Trout is reported to have been taken in 1906 from Lake Bennet, Yukon Territory, by L. Simmons.²

Certainly the largest Lake Trout ever taken in Alberta was a 52 pound, 8 ounce fish captured in Cold Lake by a Mrs. Erickson of Galahad in 1928.

All of these fish are midgets, however, when compared with the largest Lake Trout ever captured by any method anywhere in the world. This monster, weighing 102 pounds, was taken in commercial gill nets in 30 feet of water in Lake Athabasca on August 8, 1961, by McInnes Fish Products Corporation Ltd., of Edmonton. The fish measured 50 inches in length and a fantastic 44 inches in girth. Lake Athabasca, which lies partly in Alberta and partly in Saskatchewan, has also yielded an 80.5

pound Lake Trout to commercial fishermen in past years.

ARCTIC GRAYLING

(*Thymallus arcticus*)

The Canadian and world record Arctic Grayling is a beautiful 5 pound, 6 ounce fish taken from Great Bear Lake on August 23, 1966, by R. C. Beatty, Jr. This fish was 21 inches long and 11 inches around the girth. The largest Alberta grayling is a 2 pound, 13 ounce fish captured in the Embarrass River in 1966 by F. R. Bush. A 2 pound, 3 ounce grayling captured by C. Freeland in 1963 is worthy of honorable mention.

WALLEYE

(*Stizostedion vitreum vitreum*)

The Walleye, commonly although incorrectly referred to a "pickerel" by many anglers, is represented at the top of the trophy listings by a 25 pound, 41 inch long fish from Old Hickory Lake, Tennessee. This fish was captured by Mabry Harper on August 1, 1960. The Canadian record is a 22 pound, 4 ounce Walleye caught in Lake Superior on May 26, 1943, by P. E. Noon. The Alberta champion is a 14 pound fish taken in the Pembina River, west of Edmonton, by Milt Jensen in October of 1960. It is closely challenged by a 13 pound, 5 ounce Walleye, also taken in the Pembina River in 1966, by C. Mitchell, and a 12 pound, 14 ounce fish taken by L. Lemon in the Athabasca River in 1963.

YELLOW PERCH

(*Perca flavescens*)

This small cousin of the Walleye is only represented in a few trophy fish listings. The world record perch, weighing 4 pounds, 3½ ounces, was captured in Bordentown, New Jersey, in May, 1965, by Dr. C. C. Abbott. The Alberta record perch is a 2 pound, 4 ounce fish taken in Tucker Lake on December 12, 1967, by Romeo Gaucher. This fish was 15 inches in length. The largest Yellow Perch ever taken by angling in Canada is a 2 pound, 7 ounce fish captured in Fishing Lake, Saskatchewan, by Andrew Simon in 1953.



NORTHERN PIKE

(*Esox lucius*)

Of all the game fish in North America, the pike is the subject of the greatest amount of conflicting record data. The world's record presently recognized by Field and Stream magazine is a 46 pound, 2 ounce fish taken from Sacandoga Reservoir, New York, on September 15, 1940, by P. Dubuc. The fish was 52.5 inches long, and 25 inches around the girth. Ward³ reports that a 53 pound Northern Pike was taken in Lough Conn, Ireland, in 1920 by John Garvin. He also claims that the present Scottish record is a 47 pound, 11 ounce pike taken from Loch Lomond, Scotland, by T. Marvin in 1945. Both of these fish exceed the presently recognized world's record.

The largest Northern Pike ever taken by any method in Canada is a 49 pound pike caught in Lac Tschotagama, Quebec, in 1890. The Canadian angling re-

cord is a 42 pound, 12 ounce pike taken from Lake Athabasca, by F. W. Terry in 1954.

The largest Northern Pike presently in the Alberta angling records is a 32 pound, 50½ inch long fish taken by R. Knudslien in Jackfish Lake in 1948. This fish is closely followed in the records by a 30 pound pike taken from Keho Lake on June 1, 1962, by Ron Bota and a 26 pound, 10 ounce pike captured in Seibert Lake in May, 1966, by W. Diduck.

MOUNTAIN WHITEFISH

(*Prosopium williamsoni*)

The Alberta, Canadian and world record Mountain Whitefish is a 5 pound fish taken in the Athabasca River by Orville Welch on June 3, 1963. This fish measured 19 inches in length and 14 inches in girth. It was taken on a worm at a point 15 - 20 miles upstream from Fort Assiniboine, north-west of Edmonton.

A larger whitefish, weighing 6 pounds, was captured in Lake Tahoe, but it was not taken by angling.

LAKE WHITEFISH

(*Coregonus clupeaformis*)

The Lake Whitefish, a large cousin of the Mountain Whitefish, is a recent addition to the game fishes of Alberta. Until a few years ago, most anglers did not know how to catch this species effectively so that too few of them were taken annually to warrant a record listing. The situation has changed considerably, however, with the whitefish rapidly becoming one of the most important game fish in many winter sport fisheries.

The Canadian and world record Lake Whitefish is a 8 pound, 4 ounce fish taken in Lac du Bonnet, Manitoba, in 1959, by Tony De Lorme. The Alberta record is a 6 pound, 11 ounce fish taken by H. Burchett in Lac Ste. Anne in 1966.

Many Lake Whitefish exceeding 10 pounds in weight have been captured by commercial fishing throughout Canada. A 26 pound Lake Whitefish was netted in the Great Lakes, a 27 pound whitefish in Manitoba, and a 22 pound whitefish in Great Slave Lake. Whitefish up to 16 pounds have been captured in Alberta in nets.

GOLDEYE

(*Amphiodon alosoides*)

Undoubtedly the least known game fish species in Alberta is the Goldeye. This mysterious little fish frequents the turbid waters of many of our larger rivers and provides much sport when taken on light tackle. It has not been recognized by Field and Stream magazine in their record list but it would appear that the largest Goldeye ever taken by an angler is a 3 pound fish captured in the South Saskatchewan River, in 1963, by L. Fode. The largest Goldeye ever taken by angling in Manitoba is a fish weighing 3 pounds, 4½ ounces. A 3.1 pound Goldeye was reported by Keleher⁴ to have been taken in Ohio but it is believed that this fish was netted.

Perhaps the most interesting point about the game fish records, aside from the fish weights, is the fact that many of them have been set within the past ten years. This situation indicates that the opportunity of catching a trophy fish is as good today as it ever has been. Many of our northern waters have never seen a fisherman and who knows what lies waiting there? In the next part of this series, we will examine the areas of Alberta where the angler has the greatest chance of catching a trophy fish.

¹ "Hunting and Fishing in Canada", March, 1964, page 21.

² "Hunting and Fishing in Canada", March, 1964, page 23.

³ Ward, A. L., "Pike": "How to Catch Them", Herbert Jenkins — London publish, 1954.

⁴ Keleher, J. J., "Largest Fish From Great Slave Lake." Fish Res. Bd of Canada Circular No. 3, 1961.



52½ lb. Lake Trout taken from Cold Lake by Mrs. Erickson in 1928.



"Hey . . . there's fish here!"

HOW TO MAKE ICE FISHING JIGS

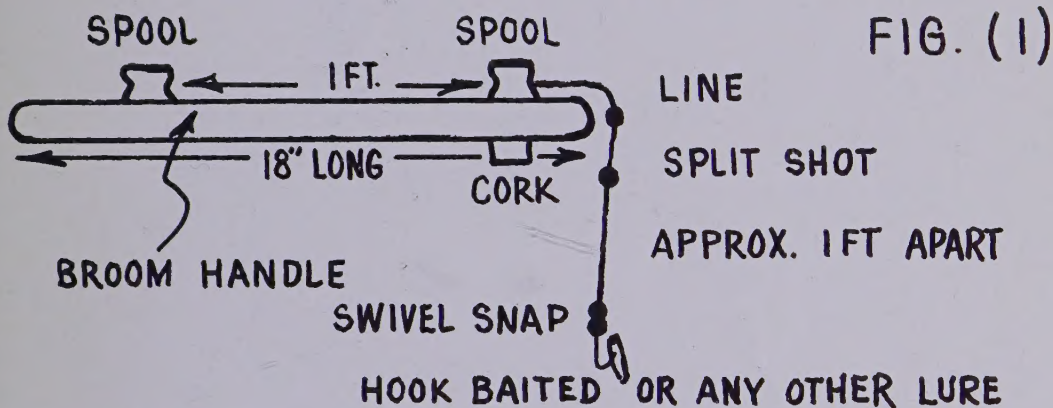
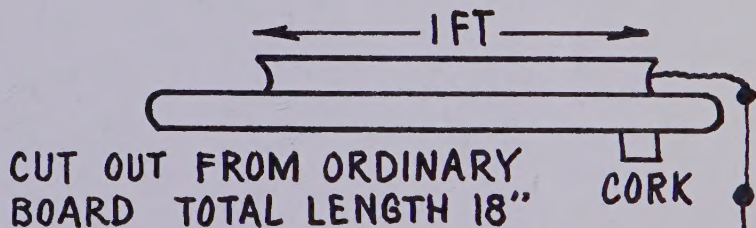
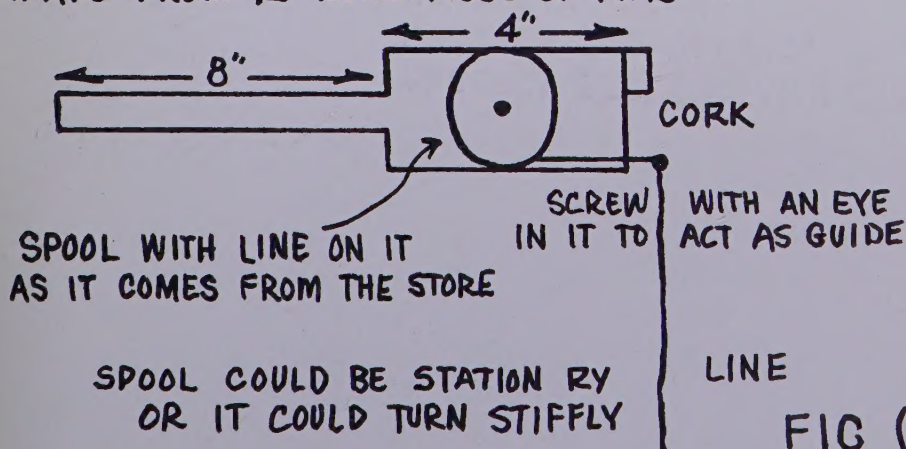
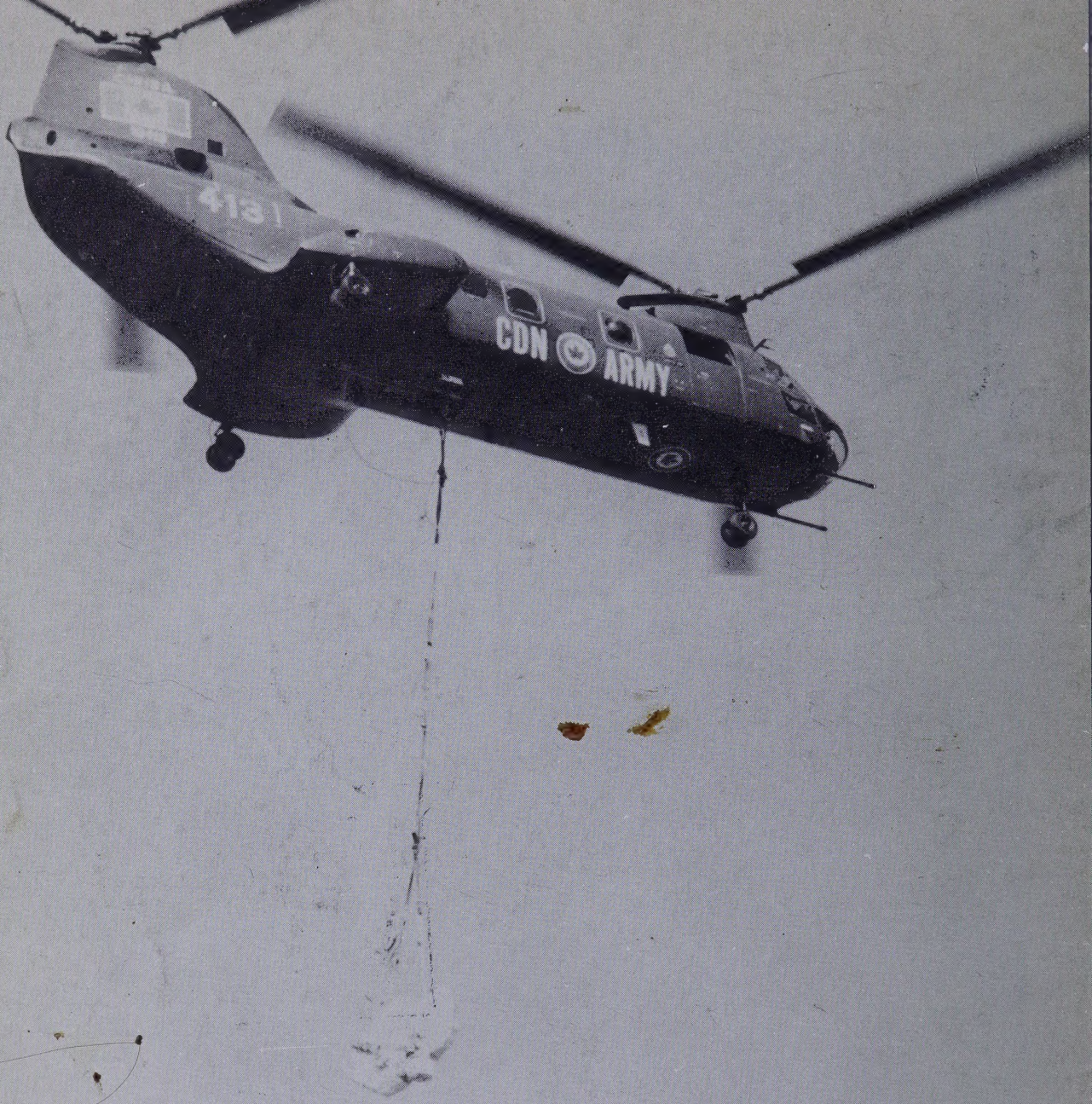


FIG (2)



MADE FROM 12" LONG PIECE OF 1 X 2






The Canadian Defence Forces assisting Dr. R. C. Fox in the removal of an entiret dinosaur specimen from a coulee near Drumheller during the summer of 1967. The dinosaur was excavated in a block of stone, encased in plaster, then lifted out of the coulee for transport to a waiting truck. Without the assistance of the helicopter, it would have been a job of many weeks to bring the specimen up from its location. (See story page 15.)

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